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TERRY KEPNER'S

portable 100

TANDY LAPTOP COMPUTING VOLUME 5, NUMBER 3 MARCH 1988



IN THE COURTHOUSE

Tracking land ownership

PUBLIC DOMAIN PROGRAMS
A vast parade of information.

STILL THE MODEL 100
MSDOS isn't necessarily better

THE POWER PIPE
Cheap portable power

BASIC POKE PROGRAMS
Store ML programs in ASCII



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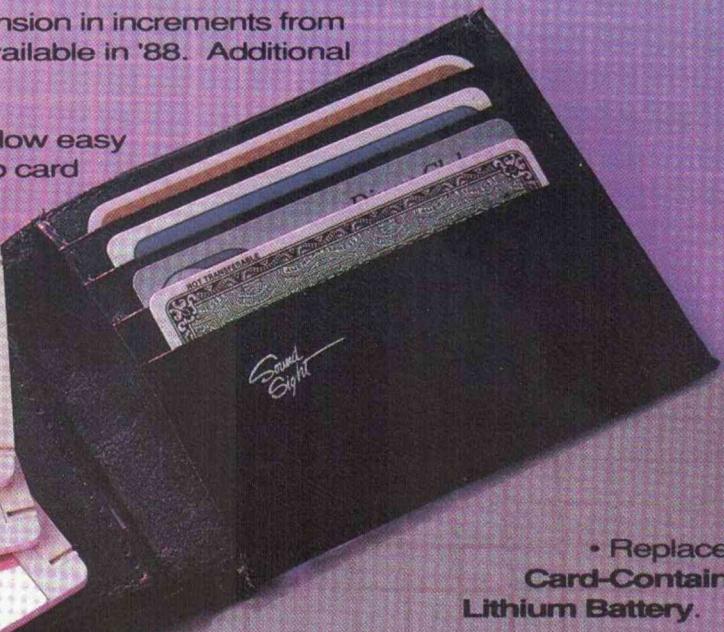
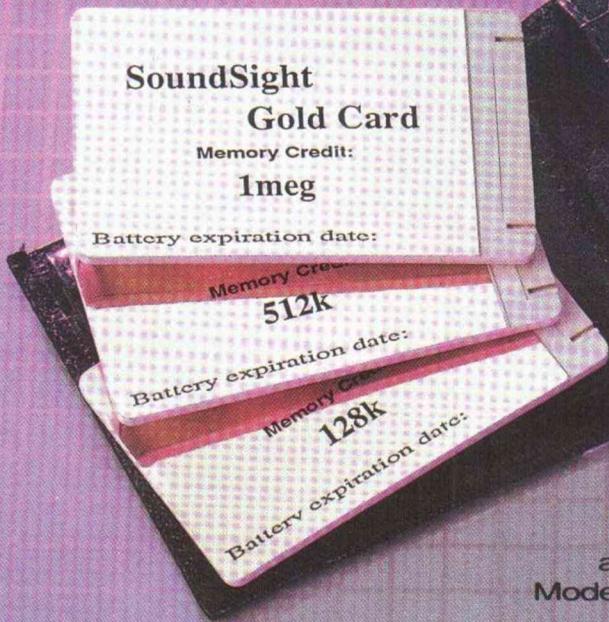
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You just place the *Disk+* diskette into the desktop's drive and turn on the computer. It powers up automatically and says "awaiting command" on your desktop's screen. Then you just put the widebar cursor on the Model 100 main menu on *Disk+* and press ENTER. You are shown your RAM files arranged just like the main menu.

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To look at the disk directory, you just press a function key on your Model 100. You see immediately the disk directory on your Model 100 screen, and it is arranged just like your Model 100's main menu.

To load a file from the diskette to your Model 100, you just move the widebar cursor to the file and press ENTER. The file is transferred to your Model 100's RAM instantly. You can press F8 and go back to the main menu, and the file you loaded from diskette is there, ready to use.

It is so nice to be able to keep your documents, programs (both BASIC and machine code) and *Lucid* spreadsheet files on the diskette, and bring them back when you need them. All files are ready to run or use with no changes or protocol by you.

If you have access to a desktop computer and don't have *Disk+*, then evidently we have done a poor job telling you about it.

All files and programs that you load or save, go over and come back exactly as they are supposed to be because of full error checking. This guaranteed integrity is really a comfort. *Disk+* is wonderful in so many other ways. For example, you can do a "save all" of all your RAM files with just a touch of a function key. That group of files is saved on the diskette under a single filename with a .SD (for subdirectory) extension. Any time you want, you can bring back all those files at once, or just one or two if you like, again with one-button ease.

Disk+ takes up no RAM. That's zero bytes either for storing the program or for operating overhead.

What really excites most *Disk+* users is text file cross compatibility. Your Model 100's text files are usable on your desktop computer, and your desktop's text files become Model 100 text files.

This means you can write something on your Model 100, and with *Disk+* transfer it

instantly to your desktop and start using it right away on your bigger computer. Or the way we like to work is to type in a document on the desktop computer and then transfer it to our Model 100 with *Disk+*. Then we print out the document, beautifully formatted, using WRITE ROM.

Disk+ works with just about every micro sold, from IBM PC and its clones, to all Radio Shack computers (yes, all), to Apple II, Kaypro, Epson and most CPM. Just ask us. More than likely, your computer is supported.

Incidentally, hundreds of Model 100 owners have gone to their Radio Shack stores and bought a color computer because it is so low priced, and with *Disk+* they have an inexpensive disk drive.

And if that weren't enough, how about this: *Disk+* also provides cross-compatibility between different computers like IBM, Apple or the Model 4 using the Model 100 as the intermediary device. Quite a feature!

The snap-in ROM is really great because you can use other ROMs like *Lucid* or WRITE ROM. They snap in and out as easily as an Atari game cartridge and you never lose your files in RAM.

Anyone who ever uses *Disk+* simply can't do without it. But so many times we have had new users call us and say, "Wow! I had no idea when I ordered it that *Disk+* would be so fantastic. I just couldn't believe that I could use my desktop computer's disk drive with my Model 100 just like it is another main menu."

That's why we sell *Disk+* on a thirty-day trial. If you aren't completely satisfied, return it within thirty days for a full refund. Priced at \$149.95 on Snap-in ROM. MasterCard, Visa or COD.

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TERRY KEPNER'S

portable 100

VOL. 5, NO. 3

MARCH 1988

ON THE COVER: *The Capital building of Texas in Austin.*

photographed by Clarence Derby (who has photographed all of the capital buildings in the United States, a project that spanned 18 years.)

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ROM WITH A VIEW

The notebook-style computer is identified, primarily, by its versatility. For some, it is a toy. To others, it is an electronic notebook. Writers often use it for interviews, salesmen for appointments, managers for sophisticated calculations. Still others use the portable as a powerful data processing machine and data communications device.

Sandra Johnson, author of "Against The Law," took her Model 100 into prison during her interviews with prisoner Tim Kirk. It was ideal because of its size and the fact that she did not need to search for an outlet. Later, she would edit and send the text, via modem, to her New York publisher. This worked well until the prison officials and the FBI began searching for the source of smuggled weapons into prison and wiretapped her telephone. The modem and the tap didn't get along at all.

Richard Krasnow operates an Electronic Payroll Services in Manchester, NH. He hired a consultant to help him convert the formatted output of his IBM mainframe to magnetic tape so he could offer Direct Electronic Funds Transfer. He intended to download the output to a tape-transfer house over the modem, then the tape would be sent directly to the bank. His computer terminal was a "dumb" terminal; no memory or storage. The consultant used his Model 100 instead, and downloaded the formatted output into RAM for transmission to the tape house. Mr. Krasnow gained a sudden respect for the "toy" when he saw it controlling the mainframe more deftly than his \$5,000.00 workstations.

A salesman for Honeywell Protection Services (alarm systems) brought his Model 100 and portable printer when he made sales calls. After discussing the customer's needs, he typed the needed equipment and labor into the computer. A program called JOBQUOT (available on our PBBS Bulletin board system) calculated the cost of the system and printed a proposal for the customer on-the-spot. Normally, the salesman had to go back to the office, prepare a proposal, and send to the customer. The effort to close the sale was made in writing days after the appointment and far less effective than personal selling. This way, with the proposal in hand, the salesman could present the system and its price to the customer for immediate discussion and approval.

Some of the most productive uses for the Model 100/200/600 are those that allow professionals to spend more time using their unique skills and abilities. A computerless writer spends more time retyping than writing. A payroll service that can only output paychecks or printouts simply creates more paperwork. A salesman makes his money by selling his product or service face-to-face and responding immediately to a customer's objections and needs.

When a portable notebook is used to allow a professional to spend more time being a professional, and less with the time-consuming drudgery, it has served its purpose and generated more than it has cost. In Portable 100, our goal is to show you new ways to enhance your productivity.

We don't do it alone, though. The ideas and concepts we present are usually written, or at least prompted, by subscribers. Portable 100 is a forum in which the ideas of readers are printed and communicated to other readers... who in turn may elaborate on them and share them with still more readers. It's an ascending spiral of enhanced productivity. As well as thanking those readers who have contributed their ideas in the past, we would like to encourage all of you to send us your ideas and uses for your 100/200/600. If you have a program you would like to share, we can put it on the PBBS (our bulletin board) so that others can download and use it.

We sincerely hope you like Portable 100 and find new uses for your Model 100/200/600. Or that you find a peripheral reviewed in an article, mentioned in the New Products sections, or advertised in the magazine which will help you be more productive, or just have more fun with your computer.

-Mark Robinson

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Advertising
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Circulation
603-924-7949

Portable 100 (ISSN 0893-942X) is published by Portable Computing International Corporation, 145 Grove Street Ext., #21, P.O. Box 428, Peterborough, NH 03458-0428. *Portable 100* is an independent journal not connected with any hardware, software, or peripheral equipment manufacturer. *Portable 100* is published monthly, except for a combined July/August issue in the summer. Entire contents Copyrighted 1988 by Portable Computing International Corporation. All Rights Reserved. No part of this publication may be reproduced without written permission from the publisher. Portable Computing International Corporation makes every effort to assure the accuracy of articles published in *Portable 100*, but assumes no responsibility for damages due to errors or omissions. Subscription Service: All subscription correspondence should be addressed to *Portable 100*, Portable Computing International Corporation, 145 Grove Street Ext., #21, P.O. Box 428, Peterborough, NH 03458-0428. U.S. subscription rates: \$24.97, one year; \$53 two years; Canada and Mexico: \$29.97, one year; \$61 two years. All other foreign (surface mail): \$44.97, one year; \$85 two years. Foreign Air Mail, add \$50 per subscription year. All payment U.S. funds drawn on U.S. Bank. Second-class postage paid at Peterborough, NH 03458, and at additional mailing offices.

POSTMASTER: Send address changes to:
Portable 100, Portable Computing International Corporation,
145 Grove Street Ext., #21, P.O. Box 428, Peterborough, NH
03458-0428.

You Asked For It!

I and, I am sure, other readers would very much like to see Portable 100 include the following:

1. For those readers who keyboard in magazine program listing—A CHECKSUM system such as used in "80 Micro" magazine.
2. A service such as "LOAD 80" in 80 Micro for furnishing tapes and disks containing programs published in each issue.
3. More specific hardware articles. In particular, an article by Mr. Oppedahl or someone else to make the Model 100 operate in an UNATTENDED auto-answer mode at a specified preset time. This to include either an assembly language or basic language program to operate said hardware.

Mr. Oppedahl had a previous article on ring detection. Unfortunately, he didn't go far enough with it. (I haven't been able to obtain the value capacitors he specified). He assumed the reader has his excellent technical expertise. This is often not the case.

An article of this type should be complete. Including parts sources, block diagram, schematic, plus photos showing how the finished cable is hooked up. A program listing for applications should be included. (Just to keep us Ph.D's happy—read that "push here dummy".)

I have his book, "Inside the Model 100." It is excellent!

Additionally, a dedicated BBS such as that maintained by

80 Micro magazine would be much appreciated. Yes, I know and have used M100SIG on Compuserve. By the time one pays CIS, TYMNET, LATA and the phone tariffs included, it can get expensive, especially in Texas. Here, it is cheaper by the minute to call Florida than a point in Texas seventy miles away.

I, for one, would be willing to pay a membership fee to help defray costs of a dedicated BBS instead of using CIS.

4. A box inserted with each article giving memory required and/or peripherals applicable.

An article of this type should be complete.

As a charter subscriber to Portable 100 since its inception, I congratulate you and your staff on an excellent magazine. The above suggestions are submitted for your consideration in making it of even more value.

Having eight years previous experience in newspaper reporting and editing, I can readily appreciate and understand an editor's problems in balancing reader demand against-cost realities. It is a delicate balance. Hang in there, guys, you can't please them all!

With best wishes for your continued success, I am,

**W.R."Hank" Henry
Fredericksburg, TX**

We do have a BBS. You can reach it by calling 603-924-9770. Set your parameters to M8N1E, to use your internal modem, or 58N1E to use an external 1200 baud modem. We don't yet have the programs featured in Portable on that BBS, but we hope to have that finished soon. Thanks for your other suggestions, they are all appreciated.

Eds.

A NEW READER

Having read two of your editions of Portable 100, I am delighted to let you know that I am thrilled with your publication. I had been most upset. I didn't get any more of my subscription, and my letters to the old publisher were returned as refused. That feeling was transferred to the Tandy Corporation, too. I felt there was nobody to share solutions to problems with, and provide general good advice and suggestions.

I got a Tandy 600 soon after it came out as my first laptop. I suppose I foolishly reasoned that if a Model 100 was good then a 600 would be better. The 11 pounds of the Tandy 600 has gotten heavier and heavier. And after getting the BASIC software package, I am truly frosty to learn that I must spend about \$300 to get an expanded memory to make that feature work. I am thinking of investing that money into a 102 with a booster pak, so I will have something that I can take anywhere. That decision was made mostly because of your magazine, and the feeling that your writers will be there to help me use that 102 and work out any kinks I may experience.

I have a few suggestions. While looking through some back issues, I discovered in the January 1986 issue the "article index" from the magazine's inception to December 1985. Some of those articles look fascinating, judging from the titles alone. I think you should indicate whether you have those old issues and whether they are available for purchase. I also think you should consider putting out a one volume collection of the most helpful features to have appeared. This latter suggestion would be a real benefit to those of us who will stick with you and want to "catch up," as well as to those who want to have a convenient place for all those programs, applications, software, and hardware reviews, etc.

Next, I would like to see some more discussion concerning the declining memory feature of nicad batteries. I have read in your pages, and heard elsewhere, that when nicad batteries are charged before being fully discharged, they tend to forget their more complete capacity. Completely discharging built-in nicad batteries in a computer is a difficult thing (such as the one which I ordered with my Booster Pak). Does that mean that for machines which can be plugged in and simultaneously recharge the nicads, that the memory will get increasingly shallow inevitably and at a much faster rate than with batteries which are able to completely discharge?

Having had some major problems with my desk word processor's communication's capability, I have appreciated being able to reread in the January 86 issue Carl Oppedahl's "Shaking Hands with your Tandy 600." It gave me the incentive to tinker around until I got it to shake hands with my laser printer. This letter is being sent on my CPT laser printer from the Tandy 600. Carl had a mistake in that article, however, because there is a print to communications port capacity, and it is listed in the manual. Because I will be get-

ting a 102, I appreciated his reference to techniques for connecting the 100 to the Model 1.

It is difficult to really assess the importance of the various pieces you present in your magazine. Things which don't interest me on one day become very important on another occasion. I read every article, and learn something helpful from each.

Please keep up the good work and keep publishing!

Ronald D. Bruce
Rupert, ID

Before you give up on the 600, you can buy RAM upgrades from Purple Computing and Node much cheaper than you can from Tandy. Give these two companies a call before throwing in the towel.

Sorry, but back issues prior to September 1987 are unavailable to us.

I read every article.

Don't worry, we definitely plan to keep publishing Portable 100.

Eds.

UTILITIES FOR THE LITTLE BEASTS THAT OWN PEOPLE

Glad you're back! I only hope the Tandy 1400 LT doesn't seduce you into entering the MS-DOS world. There are already plenty of magazines covering that. Portable 100 would hardly make a ripple in that market.

You have a unique opportunity. Tandy has sold an immense number of Model 100 and 102's. These units are overwhelmingly in active use, and you are the only publication seriously covering this market.

My wish list for future articles is loaded with utilities. Many M-100 and 102 owners are techies and very interested in what's going on inside

these little beasts that own us. An XMODEM program, upgrading the Portable Disk 1 to 200K, and alternate programming languages would all be terrific. I remember hearing about FORTH on the Model 100. Is this still available? As you can see, I'm easy to please. Just give me everything there is to know about the Model 100 and 102.

Philip Ouellette
Phoenix, AZ

You needn't worry about us abandoning the Tandy 100/102, 200, 600 market for MS-DOS. We already have a magazine, PICO, devoted to that arena.

Thanks for your suggestions.
Eds.

WHERE IS TABLE I?

I am an Associated Press journalist and owner of a TRS-80 Model 100 which I regularly use at work and, with a printer, at home. When I told a friend, also a journalist, that I was looking for a program that would allow me to control my DMP-130 printer, he loaned me the September issue of "Portable 100." I am impressed and have input Cy Callaghan's PRINTC.BA and, after substituting italics for elongation, am tickled to death with it.

I was so pleased, in fact, that I installed Thomas L. Quindry's SCRIPY.CO and input CFIG.BA. Those inputs were fine, but when I started to test SCRIPY.CO, I had a problem. The text of Mr. Quindry's article on SCRIPY.CO is not detailed (or simplified) enough for a computer user who is not a programmer, has no idea how to interpret machine language and who barely understands BASIC. And, try as I might, I could not find Table 1 to which the article refers on page 21 of the September 1987 issue, the table which the article says "gives several examples of control codes that can be sent with the GRPH key."

In any case, when I enter the file-name in SCRIPY.CO, it causes the printer to linefeed continuously

when it has finished sending text. But I am impressed with the program. Only a week before I saw the magazine and Mr. Quindry's article and program, I had wished out loud for a program using GRPH symbols and printer control codes and SCRIPY.CO looks like the answer to my prayer. If only you can point me in the direction of Table 1.

Frederick W. Rawlins
Nashville, TN

Many people have requested more information on using SCRIPY.CO. Look for a future article, soon, covering the areas missed in the original article.

Eds.

PDD2 COMPATIBILITY

Thomas L. Quindry's article "Disk Operating Systems for the Model 100" in the October issue was interesting and informative, but incomplete. The article ignores the fact that Tandy's original Portable Disk Drive has been replaced by the PDD2.

We first used Powr-Dos with the original PDD; but the lure of 200K per diskette prompted us to switch to the PDD2, which (we were told) was completely upward-compatible with the PDD1. That switch caused us many problems.

The two primary areas of incompatibility between PDD1 and PDD2 are the system loading scheme and direct sector access.

The PDD2 has a new loading scheme which eliminates the need to set any dip switches AND makes it impossible to load Powr-Dos from the system diskette. We have developed a technique to load Powr-Dos using the PDD2, but unfortunately this technique requires loading Tandy's FLOPPY program first and it bypasses the Powr-Dos copy protection.

Once the operation system has been loaded, most of the commands work fine. However, attempting to use the direct-sector-access commands causes the system to lock up.

After working through these problems, we continue to use Powr-Dos with excellent results on the PDD2.

I suspect that the other disk operating systems have similar compatibility problems; could you publish a follow-up report analyzing PDD2 compatibility for all of the operating systems?

Tim Palmquist
Delano CA

We'll do an update on Disk Operating Systems for the Tandy Portable Disk Drive as soon as possible.

Eds.

FOAM PADDING CAN SAVE YOUR CHIP

First of all, as a new Tandy 102 user, I am very happy with Portable 100 Magazine. The articles have been

I use my 102 as an extension of my Macintosh.

informative and generally useful. I am also amazed at all the add-ons that have appeared on the market! I use my 102 as an extension of my Macintosh, sending my text into the Mac via Telecom and Red Ryder, and a null modem. This is a very easy way for me to write wherever I feel like, and edit my text on the Mac later.

I have a suggestion for those who have installed the extra 8K plug-in RAM chip. Make sure you have put a piece of foam padding between the chip and the hatch to keep it snugly in place. I was recently involved in a bike accident and was carrying my 102 in my backpack while riding. Although neither I or my bike were injured, the force of my fall was sufficient enough to pop the RAM chip from its socket, causing me to lose several text files which I had not yet

uploaded to the Mac nor printed out from the 102. Had I placed a foam pad in there, everything probably would have been okay.

Lastly, is there any kind of index to back issues, and are any back issues available? Portable 100 is a fine magazine, and I look forward to every new issue.

Mark O'Brien
Ann Arbor MI

Sounds like quite an accident. Glad to hear that the Model 100 came through uninjured (except for your lost files). Neither an index nor backissues are currently available. Sorry.

Eds.

MULTI-USSES FOR A CoCo TIE-IN

You solicited ideas and commentary in the October Portable 100. I have a suggestion to all who purchased a Color Computer (CoCo) because it was the cheapest way to get disk storage for their Model 100. I am currently using the combination of the two in a rather unique way and thought that since my CoCo has proven to be the best accessory I have for my Model 100, that I would pass on the information to the rest of the people who have both machines.

With OS9 and a minimal CoCo setup, amazing things can be done. This letter is being typed on a Model 100, but the text is appearing on an 80 column monitor, and incorporates such things as on screen formatting, an online dictionary with a lookup capability, as well as pull down menus using great point and click technology with the Mouse! I also use Deskmate, OS9 Profile, TS/Edit and you can believe that this software was very inexpensive compared to the prices of any software for the Model 100 or anything else.

Using OS9 software, I have been able to construct a filing system which can be updated from either machine and read into the other, giving the ability to update records stored on the CoCo disk while in the field with the Model 100, and read-

ing the new records into the CoCo when I return to the desk. I am using the Interactive Solutions ROM database programming in the field, and I have no idea if others will work. The real point of this note is that I will be adding a hard drive to the CoCo, but the Model 100 will have 20 MB storage too.

When this note is finished it will be piped to the Model 100 and to the disk and to the DWP 210 printer all at the same time. I will be able to take it with me if I don't have time to edit it, or come back to look at it on the disk or use the Model 100 to edit it or whatever needs to be done.

If you have a CoCo and OS9, you can do it too. Boot the system, and set the terminal parameters on both machines. I am using the Multi-Pak and an RS232 pak on the CoCo which allows 19,200 baud communication, but it can be done at 300 baud through the CoCo's Serial I/O port, although it is slow, (300 baud). The secret of the system is to redirect only the input of the shell to the Model 100. This leaves the output of the shell to the screen of the CoCo. That command line is EX Shell </T2, (T1 for the Serial I/O).

Don't be concerned that this is too complex for a regular user of computers. I am doing it all the time, and I am not a programmer, or even a typist. I can't wait to find out what I can do with a high level language like Basic 09. If there is a programmer interested in this concept, boy have I got some fun ideas for you.

**David Nolton
Charlotte, NC**

We think you're a bit too modest in your claim not to be technical. It sounds like you have quite a system in operation. One that is far more than a simple "novice" system.

Eds.

HAPPY 600 OWNER REDRESSES OPPEDAH

Having been unfamiliar with Portable 100's previous incarnation, I

was thrilled to find such a magazine on the stands. I'm sold on Tandy computers. I own an original Tandy 1000, two Tandy printers (DMP 105 and 130), and a Model 600. Which brings me to the reason for my letter.

Why is every mention of the 600 accompanied with insults and apologies? For me, the Model 600 is a powerful, useful tool. As the sole copywriter for a Christian publisher's marketing department, I am responsible for producing catalogs, ads, public relations material and monthly book club brochures. While my company was waiting for my new AT&T 6300 to arrive, the 600 accompanied me on two airline flights, helped me maintain contact with several bulletin boards, and guaranteed that my projects met their deadlines. To me, the 600's or-

ticle on Telcom. He spent more time on the 102 and 200 than he did elucidating all the things he says the 600's manual leaves out. It could have been a helpful article on "Telecommunicating with Your Tandy 600." (That is its title, after all.) Instead, it was a tired endorsement for two other machines.

Best wishes for the future of your magazine. I hope our interests can eventually coincide.

**Robert M. Bittner
Woodridge, IL**

Unlike the previous managements, we feel the Tandy 600 is a real sleeper. If it had been offered to the market at a better price than its original \$1,599, it would have been a big seller. Now, with the MS-DOS machines at the \$1,000 mark, the machine is simply outclassed. And Tandy can't manufacture them cheap enough to combat those machines. Sigh. For those willing to look at features instead of DOS, the 600 is a great buy at \$599.

Eds.

The 600's orphanage is immaterial.

phanage is immaterial; the machine works.

I purchased my 600 when Tandy was offering close-out sales. For only \$100 more than the Model 102, I got 32K of memory (compared with 24K), a better and bigger screen, and a 360K internal disk drive (the deciding factor for me). What did I give up? As far as I can tell, I gave up built-in BASIC and third-party support. Since the 600 is powerful enough as is, and I do have access to more powerful desktop computers, I don't miss these "benefits" at all.

In the future, I hope you are more open to meeting the needs of your Model 600 readers. (I'm sure I'm not the only happy 600 owner.) And I hope your attempts to do so won't all read like Carl Oppedahl's recent ar-

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Public Domain Programs for the 100/102

Frustrated by the lack of commercial software for your Tandy computer? Maybe you're looking in the wrong places

by Thomas L. Quindry

There are just so many commercial programs you can buy for the 100. Just as important are the specialized programs that Model 100 users have written to solve their own applications problems. Many of these people are generous enough to place their programs in the public domain so people with similar needs can get and use them for free.

Getting these free programs takes a little knowledge and can take some doing. The official distribution of this software is practically nil except through the commercial database networks like Compuserve, The Source, Genie, and Delphi. This article will tell you about these databases and some of the other places where you can get these programs. I will also tell you how to get them.

FINDING PUBLIC DOMAIN PROGRAMS

Electronic Bulletin Board Systems (BBSs), whether commercial or private are your best source of public domain programs and other information about your computer. If this BBS caters to the Model 100, you will be able to find programs and discussion on popular topics.

You can no doubt find word processing programs, spreadsheets and templates, loan amortization, stocks,

general math, time management, and engineering programs like surveying, statistics, scaling, etc. You may also find financial and accounting information, screen dumps, barcode programs and files, file transfer programs, programming utilities, print formatters, line renumbering utilities, and RAM-oriented utilities to save you from a cold-start crash. Also available may be reference texts on many topics such as rechargeable batteries, different storage devices, and programming techniques. On several BBSs, I've also seen a number of files on tips for using your portable disk drive.

GETTING PUBLIC DOMAIN PROGRAMS FROM A BBS

Besides being able to learn more about your computer and perhaps get help with your computing problems, you can get public domain programs from the BBS you call. TELCOM is very limited in its communications abilities. There is no direct provision for error-checking protocols built-in like Xmodem. All the Bulletin Boards I've been on store the Model 100 programs in ASCII because of the limits of TELCOM, though files may still have extensions of .BA, .DO, or .CO to tell you what type they are intended to be. They may also have the extension .100 or

.200 to tell which computer they are for. Some BBS programs now will not let you download a .BA or .CO file in ASCII and the .100 or .200 also gets around this limitation. When they are transferred to your computer they are saved as a document, or .DO, file in your computer. You must convert it after you get off the BBS.

If you have downloaded a BASIC program, you go to BASIC and LOAD "filename.DO". Then you SAVE "filename.BA" and you can KILL the .DO version if you care to. If the file is supposed to be a machine language program with the .CO extension, you will have to examine it to see what format it was saved for transfer. It can be a BASIC program with data statements that POKE the code into memory for saving as a .CO file when you run the program; or else it may be an ASCII file with hexadecimal notation (base 16). Most files of this type are converted to their proper form by a program called CHANGE.BA which you should also find on the same BBS.

ERROR CHECKING PROGRAMS

There are basically two error checking programs to download programs with. They use the Xmodem protocol that is common on many Bulletin Boards. Xmodem pro-

vides a checksum at the end of each block of data that is transmitted. If the checksum isn't correct, the block of data is sent again. *SXM.BA* is a public domain program that only works with the 300 baud internal modem. There are versions to use with the Model 100 and the 200. There is also a version to use with the Chipmunk 3.5-inch disk drive called *SXMCHP.BA*. *SXM* is slow but it does do the job. It will only download ASCII files.

A commercial program, *XTEL.CO* from Sigea Systems, Inc., can be used with external modems as well and will download *.BA*, *.CO*, and *.DO* files and place them in their proper place in the Model 100. The only catch to this is that all files you should find on the BBS should only

GEnie does not increase your hourly rate for high speed modems

be placed as a *.DO* file since they are in ASCII. If you give the extension as displayed on the BBS, it will go to the wrong place and perhaps cause your computer to lose all its programs if you try to run it. You must remember to name the file with the *.DO* extension as you download if you use this program.

PUBLIC DOMAIN SOURCES

Commercial databases like CompuServe, The Source, GEnie, and Delphi are your greatest sources of public domain programs for the Model 100, 200, and 600. Public domain programs from these services are not restricted to the files of interest here, and in fact include primarily MS-DOS programs. The commercial databases also have other services which will not be covered here.

There is quite an expense to bear to

use these databases, though. A registration fee of anywhere from \$30 to \$50 gets you on the first time and then non-prime time rates are from \$5 to \$8.40 per hour at 300 baud and from \$5 to \$12.50 per hour of hook-up time at 1200 bps. Only one, GEnie, does not increase your hourly rate for higher speed modems and charges \$5 hourly for non-prime time. For this reason I will use GEnie as an example of what you can expect from a commercial database.

The GEnie Laptops RoundTable is run by Dave Thomas along with Mortimer 100 and Mortie 600, his laptop computers. Dave is one of those responsible for the CompuServe Laptop Special Interest Group (SIG) being as big as it is today. And he is likely to make GEnie's SIG just as large. The sponsor for the

RoundTable is Traveling Software, Inc., one of the primary laptop software companies today.

In getting into the Laptops RoundTable, you have a choice of getting on the Laptops Bulletin Board, the Real-Time Conference, the Software Libraries, finding out about the RoundTable or reading RoundTable News. Selecting the Software Libraries gives you several choices which can lead to information about several types of laptops including the Tandy laptops, the NEC laptops and all other laptops and handhelds. Model 100/102/200 programs are further divided into Utilities, Text Edit or Print, Telcom, Applications, and Entertainment. Other programs are in separate categories for the NEC, Olivetti, and M-10, PC-Compatible laptops, CP/M

Getting on a BBS

by Thomas L. Quindry

The Model 100, 102 and 200 are naturals for telecommuting. A program called *TELCOM* already exists in ROM and there is also a built-in modem. For \$19.95 you can get a Direct-Connect Modem Cable from Radio Shack (R/S #26-1410). This is probably the best \$20 you can ever spend for your Model 100 unless you get an external modem. With the internal modem, you can automatically dial your phone numbers. To do this, create a file called *ADRS.DO* which has the names of your Bulletin Boards to call and their phone numbers. Without getting into the fancy stuff, this file would have the name and phone number for a BBS on each line. A couple of entries might look like this: *BBS Name #1 :xxx-xxxx<>, BBS Name #2 :yyy-yyyy<>*, where the x's and y's would be replaced by digits for telephone numbers. You can also include the area codes if needed. The colon is

needed to tell *TELCOM* that what follows is the phone number. The "<>" symbols tell your *TELCOM* program to keep the phone open after you have dialed the number.

Now that your *ADRS.DO* file is set up, you must get into your *TELCOM* program and make sure the communications, or *STAT*, parameters are correct. For use with the internal modem, you want the *STAT* parameters to read *M8N1E*. The "M" is for modem, "8N1" is for 8 bit words, no parity, and one stop bit, and the "E" is for enabling the XON/XOFF status. XON/XOFF enabled allows your computer to temporarily halt the BBS from sending data if the data is being received faster than it can be processed. After entering *TELCOM*, push the *F3* key, type *M8N1E,10* and then press the *ENTER* key. The last three characters set the dialing pulse rate and are optional. This sets the *STAT* parameters.

SOFTWARE

laptops, Tandy 600 and others. There are also files on products and reviews. These are the types of things you will find on the other commercial databases as well.

Dave Thomas provided me a list of programs on the GENie Laptop Roundtable. Included in the SIG are some programs that are not public domain but are discontinued commercial Traveling Software programs that have been provided for users of the SIG only. Table 1 gives a sampling of the several hundred programs there.

PRIVATE BULLETIN BOARDS

Private bulletin boards supporting the Model 100 can be scarce. If you are lucky, you will find one you can call locally. Otherwise, you will have to make toll calls. Distance becomes insignificant if you have to call

long distance anyway. Anywhere from a few miles away to across the continental USA will cost you about the same. The \$5 per hour charge from Genie becomes significant as you can expect about the same costs per hour in toll charges. This is also where it may pay to buy a 1200 baud external modem. Here are some good Model 100 BBSs that I know:

CLUB 100: A Model 100 User Group
Sysop: Richard Hanson
Phone: (415) 939-1246
Modem Speed: 300/1200
Specialty: Model 100 only
Hours: 24 Hours

Location: Pleasant Hill, CA
Registration: Phone-in or Mail-in
Fees: Free, \$12, \$24, \$48 options

Near San Francisco, CLUB 100: A Model 100 User Group, is dedicated to support Radio Shack/Tandy

After the *STAT* parameters are set and you have your phone numbers in the *ADRS.D0* file, here's how to autodial. The *F1* key is used to "FIND" your telephone number to dial. All you have to do is type in part of the name and *TELCOM* will find the first occurrence of whatever you type in. If that isn't the entry you want, hit the *F3* key for "MORE" and your next entry will appear. When the BBS you want to call is displayed, the *F2* key "CALLS" the number. If the number is busy, you will have to hit the *SHIFT* and *BREAK* key combination and then select your telephone number all over again. You can hear whether your phone call is ringing or busy if you have enabled *SOUND ON* by entering that command while in BASIC.

The big advantage of using an external direct connect modem is that you can do your telecomputing at greater than 300 baud. I would recommend a 1200 bits per second (bps) modem. The 2400 bps might be a little too fast for you to read messages transmitted to your computer. You can't use the autodialing function

described above but this doesn't have to be a drawback. Most modems these days have "Hayes Compatible" command sets. This means that it has at least a subset of commands as the modems sold by Hayes. You can easily command these modems to dial by knowing just a few things. First you want to set the *STAT* parameters as above but for the external modem. The only difference from above is that the first digit would be a number rather than the letter "M." For 1200 bps you would set the *STAT* to *58N1E* and for 2400 bps, *68N1E*. Each increase in the first digit doubles the transmission rate. A *38N1E* would set it to 300 baud for an external modem.

To dial the phone, you now just hit the *F4* key to get into the *TERM* (terminal) mode and then enter the Hayes command, *ATDT* or *ATDP*, followed by the phone number. The *AT* is the "Attention" command, *D* tells the modem to dial the phone, and the *T* or *P* tells the modem to touch tone or pulse dial respectively. □

Model 100, 102 and 200 computer users both with access to PD software and other useful information. CLUB 100 is not just a BBS, but rather, a full fledged support group that is application oriented. CLUB 100 has a highly professional quality membership core of local users. CLUB 100 is not intended, nor run as a profit motive business, it is run on a "break even" basis. Please note that CLUB 100 has been in existence for about five years. It is not the same "CLUB 100" recently started by the now defunct *Laptop User Magazine*. Because of this confusion, Richard Hanson will extend Level 2 access for one year to all who sent money to the other "CLUB 100" and can prove it by a copy of a cancelled check or other means.

In just the last year, the CLUB 100 BBS has expanded from one phone

CLUB 100 BBS is by far the largest privately owned Model 100 resource available.

line and 400 members to a four-line BBS used by 2000 users. It is by far the largest privately owned Model 100 resource available. A large database that rivals those on the commercial databases for Model 100 public domain programs and growing is available and expanding exponentially. CLUB 100 has arranged with Model 100 software and peripheral manufacturers to offer members discounts when they mention CLUB 100 specials.

Free Level 1 membership, which is free, provides 20 minutes of on-line time per call but no downloading privileges. Most of the members of CLUB 100 do not tele-communicate

anyway. They make contact by regular mail by making extensive use of the CLUB 100 Index. "I have been in direct contact with members in France, Australia, Canada, Alaska, South America, England, Hawaii, and many other places," Rich Hanson told me. "We even helped a missionary family in New Guinea by responding to a letter they sent us. They get mail by air plane once a week... we met their needs, too! The vast majority of our online users are professionals, many with advanced degrees. It is a distinct pleasure to e-mail with these people, they're simply great! CLUB 100 is a fun place for all those who contact us, and get involved. We will continue to do our part by providing the best service we can to our membership."

The CLUB 100 Index is mailed free, twice a year, to all who sign up for CLUB 100. It has all their public domain software offerings plus a small selection of hardware items. Mail order is less expensive than telephone toll charges anyway so the index is a good way to go. There are eighteen disks with 14 or more programs on each of them. Each disk costs \$8.95 plus \$1.00 for shipping. Regardless of how you store your programs, CLUB 100 can probably accommodate you. They distribute the programs on cassette, and Tandy portable, DVI, and MS-DOS disks.

Contact Richard Hanson, Club Secretary, by voice at (415) 932-8856 (answering machine) or write Hanson-McBride Services/CLUB 100, PO Box 23438, Pleasant Hill, CA 94523 for information.

NCTCUG

Sysops: Don Gruenther and Bill Lathom
 Phone: (703) 820-8969 or (301) 469-8034
 Modem Speed: 300/1200
 Specialty: MS-DOS, TRSDOS, Most Tandy computers
 Hours: 24 hours
 Location: Washington, DC Metropolitan Area
 Registration: Phone-in
 Fees: \$25 club membership

This BBS is sponsored by the National Capital Tandy Users Group in the Washington, DC metropolitan area. Calls go through call forwarding so that the widest possible range of metropolitan users can get on toll free. The BBS usage to the main conference is free but downloading is restricted to members only. A Model 100 conference for members only has a very good selection of programs which is expanding.

Tandy Hotline

Sysop: Bob Cook
 Phone: (804) 358-5824
 Modem Speed: 300/1200/2400
 Specialty: MS-DOS, TRSDOS, Most Tandy Computers.
 Hours: 24 Hours
 Location: Richmond, VA
 Registration: Phone in
 Fees: None

Library 1 Utilities

DEJAH.100 - An artificial intelligence utility
 MLOOKT.BA - Examine Tandy 100/102 memory
 KISS.CAS - Cold start recovery programs: CAS
 LOCATE.BA - String search of RAM or ROM
 LFEED.BA - Line feed program for 100/102 & M-10
 FILCMP.BA FILE COMPARER - Compares ASCII files
 RENUM.BA - Renumber Basic files in .DO format
 SPEECH.SYN - How to make speech synthesizer
 VOICE SYNTHESIZER - Messages with parts/data for V.S.
 L-DVI.100 - Enable/disable D/VII software
 TRON.100 - A tron command for model 100 basic
 TCOMP.BA - Basic compiler for m100

Library 2 Text Edit/Print

MIX-IT.100 - Converts upper case text to mixed
 LENGTH.BA - Creates LENGTH.CO for file lengths
 SCRIPY.BA - Machine language print formatter
 SEARCH AND REPLACE - Search and replace text editor
 CASE CONVERTER - Convert letters upper <-> lower case
 ENCRYPT.DO - Encryption & decryption of TEXT
 PIXEL MAP FOR .DO FILES - Maps on screen pages of .DO files
 VIEW.HEX - A 60 x 10 column display for text

Library 3 Telcom

PBBS.100 - MINI-PBBS v3.1 for the 100/102
 TRANSF.ARC - IBM<->100/200 transfer & format
 TANDY<>MAC.MW - MacWrite: Connecting Mac to 100/200
 SXM.100 - Xmodem protocol file transfer
 SXM.200 - Enhanced Xmodem ;for the Tandy 200

Library 4 Applications

DEPTH.BA - Helps photographers with settings
 POSTER.100 - Banner printer/Invert/Normal/DMP130
 MARKET.100 - A Portfolio Management program
 TIMMGR.100 - Traveling Time Manager: 100/102
 APPMGR.100 - Appointment Manager: Model 100/102
 CLOCK.100 - Marvellous multi-purpose clock!!
 LOAN CALCULATOR - Four function loan calculator
 RATER.BA - For the serious horse racing fan
 BANNER PRINTER - Print large letters sideways
 CLOCK.BA GRAPHIC - Round faced alarm clock
 SPEAKING CLOCK - Modify CLOCK.BA GRAPHIC for speech
 DBNEW.100 - Enhanced database manager - 100/102
 TAXTBL.LUC -> LUCID ROM - Tax table calcsheet for Lucid ROM

continued

Table 1. A small sampling of the GENIE Laptop Roundtable programs for the Model 100. This is a very small partial listing.

SOFTWARE

The Tandy Hotline is supported by the manager of the Radio Shack Training/Support Center in Richmond, Virginia and is the host BBS for the Richmond Tandy Users Group. The Tandy Hotline provides support and message conferences for practically all Tandy Computers including the 100/200/600. Users normally get 15 minutes on their first call, and 60 minutes on their second call. The only other limits are normally 2 hours a day and in order to download files, there is five to one download to upload ratio calculated in bytes that you must maintain.

The Byteline BBS

Sysop: Chuck Ober
Phone: 317-782-3220
Modem Speed: 300/1200
Specialty: MS-DOS, TRSDOS, CP/
M, Coco, Model 100
Hours: 24 Hours
Location: Indianapolis, IN
Registration: Phone-in

You can get advice and help here.

Fees: \$15

In Indianapolis, Indiana, the Byte-line BBS is host to the Tandy Users Group as well as a NEC computer club. You can get advice and help for your Model 100 computer here. The registration fee is waived if you are a member of either of the above mentioned Computer Clubs.

The Exclusive-80 BBS.

Sysop: Brian Driscoll and Bob Griggs.
Phone: (215) 739-9512
Modem Speed: 300/1200/2400
Specialty: MS-DOS, TRSDOS, CP/
M, Model 100/200
Hours: 24 Hours
Location: Philadelphia, PA
Registration: Phone-in
Fees: Donation requested

Library 5 Entertainment

BRIDGE.100 - Contract & Duplicate bridge! Wow!
VPOKER.BA - Stupendous solitaire poker! A MUST!
SOUND GENERATOR - Nine SOUND sub-routines: Bomb to UFO
SLOTS.100 - Super slot machine for 100/102/200
FROGER.BA - Anyone lost a frog?
EIGHT.BA - Superb card game of Crazy Eights
HUIT.BA - Jeu de cartes par un Canadien
ELIZA THE SHRINK - Private psychiatrist for 100/102/NEC
STAR FIGHTER - Nifty arcade "shout 'm up" game
FLIGHT OF THE BUMBLE BEE - Rimski-Korsakov superbly executed
GRANDFATHER CLOCK - Superb graphics, chiming clock
CASINO.CA - Lucid ROM spreadsheet dice game

Table 1, continued from previous page.

Though gravitating toward becoming an MS-DOS board, support for the Tandy line of computers is strong. Brian and Bob plan to continue to support the Tandy computers as long as there is a need. Among those supported by the Exclusive-80 is the Model 100/200.

MECCO

Sysop: Ed Bailey
Phone: (613) 741-6160
Modem Speed: 300/1200
Specialty: Most Tandy computers
Hours: 24 hrs
Location: Ottawa, Canada
Registration: Phone-in
Fees: Must be club member

This BBS is operated for the members of the Micro 80 Computer Club of Ottawa (MECCO). You must join the Computer Club to have full access to this system. The Sysop for the Model 100/200 special interest group is Bob Thomson while Ed Bailey is the BBS Sysop. This BBS has a good selection of Model 100 programs and a Model 100 conference for question and answers about your Model 100 or 200.

SEMI-PRIVATE SOURCES

NEC Home Electronics BBS
Sysop: Technical Support Staff
Phone: (800) 632-7227, In Illinois
(312) 860-2602
Modem Speed: 300/1200/2400

Specialty: MS-DOS, Laptops, CP/M,
NEC Products
Hours: 24 Hours
Location: Wood Dale, IL
Registration: Mail-In
Fees: Free - Must own or use NEC
product

The NEC Home Electronics BBS is unique in that it has a toll free 800 number for access. It is for the exchange of information relating to NEC products. It is sponsored by the Technical Support Department in the Computer Products. To use the NEC BBS, you must own and/or use a NEC computer or peripheral. They consider the Tandy Model 100/102 to be a "NEC PC-8201 clone." Many of the BASIC programs for the NEC PC-8201 will work on the Model 100.

EVI/Fastcomm Support BBS

Sysop: Kurt Schelin
Phone: (703) 476-1243
Modem Speed: 300/1200/2400/
9600/19,200
Specialty: Model 100 and MS-DOS
Hours: 6 PM to 9 AM
Location: Reston, VA
Registration: Phone-in
Fees: Free

Kurt Schelin's interest in the Model 100 started this year when he purchased a Model 100. This BBS mainly supports customers of Electronic Vaults Inc., which manufactures and sells Fastcomm modems.

Kurt will give you access to the Model 100 conference if you ask, even if you are not a customer. He has a surprisingly good selection of Model 100 programs for the short time he has sponsored the Model 100 conference on his BBS. Kurt tells me that the Model 100 works using the Fastcomm modem. "Things sure zip by though," says Kurt.

80 Micro BBS

Sysop: Keith Johnson
Phone: (603) 924-6985
Modem Speed: 300/1200
Specialty: MS-DOS and all Tandy computers
Hours: 24 hours
Location: Peterborough, NH
Registration: Phone in
Fees: None

Fees: None

The 80 Micro BBS, sponsored by 80 Micro magazine, has a good selection of Model 100 programs. On their Model 100 conference, they also have a good message base of Model 100 users as well as users for the other non-MS-DOS laptops by Tandy.

PICO BBS

Sysop: Terry Kepner
Phone: (603) 924-9770
Modem Speed: 300/1200
Specialty: All laptops
Hours: 24 hrs
Location: Peterborough, NH
Registration: Phone-in
Fees: Free

The PICO BBS is sponsored by PICO, The Journal of Portable Computing. This BBS has a good selection of programs for all laptops. Quite naturally, there is a good selection of programs for the Model 100. It is a good place to get your Model 100 questions answered as Terry Kepner



NEW!

For Model 100
Model 102
Toshiba 1100+
NEC 8201
Epson HX20/HX40
IBM Convertible
Sharp 2500
Zenith 171
Zenith 181
Grid

SafeSkin™ KEYBOARD PROTECTOR

Finally, A keyboard cover that remains in place during use!

- **PROTECTS CONTINUOUSLY - 24 HOURS A DAY** - Against computer downtime due to liquid spills, dust ashes, staples, paper clips and other environmental hazards.
- **REMAINS IN PLACE** during the operations of your keyboard. SafeSkin is precision molded to fit each key - like a "second skin."
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- **EXCELLENT FEEL** - The unique design eliminates any interference between adjacent keys, allowing smooth natural operation of your keyboard.
- **SafeSkin IS VIRTUALLY TRANSPARENT** - Keystops and side markings are clearly visible. In fact, SafeSkin is so clear, sometimes you may not know it's there!
- **DURABLE - LONG LASTING** - SafeSkin is not a "throw-away" item. Many of our protectors have lasted over 3 years under continuous daily use, without failure.

SafeSkin is available for the portables listed above and most popular desktops PC's including IBM, APPLE, AT&T, COMPAQ, DEC, EPSON KEYTRONICS, NEC, TANDY, TOSHIBA, WANG, WYSE, ZENITH. Specify computer make and model. Send \$29.95, Check or M.O., VISA & MC include exp. date. Dealer inquiries invited. Free brochure available.

Merritt Computer Products, Inc.
4561 S. Westmoreland / Dallas, Texas 75237 / 214/339-0753

Circle 65 on Reader Service card.

has always had a great love for the Model 100. Terry now publishes Portable 100 so you can bet this will remain a good source for Model 100 users.

A SAMPLING OF PUBLIC DOMAIN PROGRAMS

Dave Thomas and Rich Hanson have each provided me a disk for the Tandy Portable Disk Drive with a sample of the Model 100 programs that you can get from their databases, The GEnie Laptops Roundtable and CLUB 100 respectively. The CLUB 100 disk also has step-by-step directions on how to access their BBS using your Model 100. These programs will be placed on the PICO BBS so you can download any of interest. Additionally, I will make these disks available for \$6 each. Also, In the September issue of Portable 100 I previously provided a disk with Model 100 Public Domain Software including

SCRIPTY and LENGTH which were published as an article there (pages 20 and 59). This disk contains many "must have" programs including SXM, DSKMGR, PIXMAP, VIEW, and CHANGE. It is also \$6.

To send for these disks, specify the CLUB 100, GEnie, or SCRIPTY disks at \$6 each disk. Mail to Thomas L. Quindry, 6237 Windward Drive, Burke, VA 22015. If you request when you order a disk, I will send your name for enrollment in CLUB 100 at the Level I (free) access and send your name to Dave Thomas for any GEnie mailings of information.

The Model 100 in the Courthouse

Determining who owns the land is no trivial task

by Vincent A. Stewart, Jr.

The offices of County Clerks in courthouses where petroleum exploration is active are filled with petroleum landmen, equipped with yellow legal pads, Allen scales, protractors, and closely guarded copies of land-ownership maps, searching the real property records to discover the details of property ownership of tracts where drilling is proposed.

The work of the petroleum landman is basic to any exploration project, since without drilling rights, no exploration is possible. Among the most onerous tasks of the landman is the preparation of *runsheets* which must list in chronological order every public record relating to the subject tract of land.

Typically, this has been a Herculean task for the landman, who must search the indexes of public records for every name that has ever been associated with the tract of land, write down the details of the particular instrument (usually on a yellow legal pad), then return to his office or motel room where he has to arrange the items in chronological order.

A complicated runsheet can easily involve 100 to 200 items, from disparate sources, the collection of which can easily require one to two weeks of work. The further task of arranging the items and typing the runsheet, in appropriate order, carefully proofread, can often require as much time as that required to collect the information.

One of my first thoughts, therefore, when I acquired my Model 100 computer was to use it to shorten this process. At first, I simply used TEXT with its cut-and-paste function to take notes and prepare runsheets.

From the beginning, even in this rather unsophisticated application, my Model 100 proved to be a time-saver, cutting the time required for arranging and typing the runsheet in half. As I began to learn more about BASIC programming, however, I began to see that even further gains were possible.

The product was ultimately *RUNSHT.BA*, a program that permits me to enter information at the courthouse,

push a single number plus *ENTER* to sort those items in chronological order, return to my office or motel room, plug in my printer, and print out a copy of the runsheet.

After each day's research, I have a finished copy of my work thus far to proofread and to guide the next day's work. When I am staying out of town, I usually go out to dinner while the tiresome typing job is completed.

The program is simple to use. Place the cursor on *RUNSHT.BA* on the menu and the first screen lists the name of the program. Press *ENTER* and a menu of choices is offered:

1. Enter Instruments
2. Sort Items
3. Print Runsheet
4. View Runsheet
5. Choose File
9. EXIT

Since the program requires that a file be present to receive data, the first choice must always be Number 5, *Choose File*. Upon making this selection, you will be told

```

10 '          RUNSHT.BA
20 CLS:CLEAR FRE(A)/2
30 PRINT:PRINT TAB(10)"THE COMPLETE LANDMAN"
40 PRINT TAB(10)"]Runsheet Program]"
50 PRINT TAB(11)"by Vincent Stewart"
60 PRINT:PRINT TAB(1)"(C) 1986 by VINCENT STEWART CONSULTING"
:PRINT
70 LINE INPUT"          Press ENTER";A$
```

100 ' Selection from Initial Menu

```

110 CLS:PRINT TAB(1)"THE COMPLETE LANDMAN Runsheet Program"
120 PRINT TAB(11)"1-Enter Instruments"
130 PRINT TAB(11)"2-Sort Items"
140 PRINT TAB(11)"3-Print Runsheet"
```

continued

Listing 1. A BASIC program for recording land history from court house records

what file, if any, is currently being addressed by the program. If you wish to continue using that file, just press **ENTER**. Otherwise, name a new file.

Note that once a file and its format is established, corrections are best made by using **TEXT**, being certain that the format remains undisturbed, especially the number and placement of commas.

Next, select Number 1, *Enter Instruments*. The program will prompt you for information. The first prompts are for Volume and Page numbers. These may be either numbers or letters. Then you are asked for the kind of record. I use abbreviations like *DR* for Deed Records, *DC* for District Court Records, *PR* for Probate Records, *DT* for deed of trust records, and so forth.

You are then asked, successively, to name the Grantor and Grantee. Only 18 spaces are allotted for each, so that if there are multiple Grantors or Grantees, or if the names are longer, the additional information can be saved for the *Comments*.

The next three prompts are for the date of the instrument, with month, date, and year given separately for use by the sorting routine of the program. Since many runsheets contain records from both the nineteenth and twentieth centuries, I always enter the year as four digits.

Many runsheets contain records from both the nineteenth and twentieth centuries

Then you are asked to state the number of acres that are included in the subject tract. This number may extend to three decimal places. Should you enter more than three decimal places, the program will round the number off to three places.

Next the program asks for the record date of the instrument. This date is often as important as the instrument date, although it can sometimes be years later than the instrument date, because it announces the date of *constructive notice* of the execution of the instrument.

Finally, you are asked to name the type of instrument, whether it is a deed, an affidavit, a deed of trust, a court judgment, and so forth. Only eight spaces are allotted for this purpose, so that abbreviations must often be used.

The reason for our miserly allocation of spaces for items is so that records can be displayed, in an orderly format, one at a time on the Model 100 screen. But I find that these limitations are really helpful, forcing a useful brevity in note-taking. When I used to teach composition, I discovered that one of the greatest errors students make in doing

```

150 PRINT TAB(11)"4-View Runsheet"
155 PRINT TAB(11)"5-Choose File"
160 PRINT TAB(11)"9-EXIT"
170 INPUT" Which do you choose";A
180 ON A GOTO 1000,2000,3000,4000,5000,,,9999
1000 ' Make Runsheet Entries
1010 CLS
1020 INPUT" What is the volume";VL$
1030 IF LEN(VL$)>4 THEN GOTO 1020
1050 INPUT" What is the page";PG$
1060 IF LEN(PG$)>3 THEN GOTO 1050
1080 INPUT"What kind of record";RE$
1090 IF LEN(RE$)>4 THEN GOTO 1080
1120 IF LEN(GR$)>18 THEN GOTO 1110
1140 INPUT" Who is the Grantee";GE$
1150 IF LEN(GE$)>18 THEN GOTO 1140
1170 INPUT" Month (00)";MO$
1180 INPUT" Day (00)";DY$
1190 INPUT" Year (0000)";YR$
1200 INPUT" How many acres";AC
1220 INPUT"Recorded MM/DD/YYYY";FI$
1230 INPUT" Type of Instrument";TI$
1240 IF LEN(TI$)>8 THEN GOTO 1230
1260 PRINT TAB(8)"!!!DO NOT USE COMMAS!!!!"
1270 LINE INPUT" Comment Line 1: ";CA$
1280 IF LEN(CA$)<=39 THEN GOTO 1300 ELSE GOTO 1270
1300 LINE INPUT" Comment Line 2: ";CB$
1310 IF LEN(CB$)<=39 THEN GOTO 1330 ELSE GOTO 1300
1330 LINE INPUT" Comment Line 3: ";CC$
1340 IF LEN(CC$)<=39 THEN GOTO 1360 ELSE GOTO 1330
1360 LINE INPUT" Comment Line 4: ";CD$
1370 IF LEN(CD$)<=39 THEN GOTO 1390 ELSE GOTO 1360
1390 GOSUB 5000
1420 INPUT" 1-Save 2-Retry ";A
1430 IF <A=1> OR <A=2> THEN GOTO 1450 ELSE GOTO 1440
1440 PRINT TAB(9)"PLEASE CHOOSE 1 OR 2!"
:GOTO 1420
1450 IF A=1 THEN GOTO 1500 ELSE GOTO 1470
1470 GOTO 1010
1500 OPEN RA$ FOR APPEND AS 1
1510 PRINT #1,YR$","MO$","DY$","VL$","PG$","RE$","GR$","GE$","AC$","FI$","TY$",
      "CA$","CB$","CC$","CD$"
:CLOSE
1520 INPUT" 1-Next 2-View 3-Sort 4-Menu 9-Exit";A
1530 ON A GOTO 1000,4000,2000,100,,,9999
2000 ' Sort the Runsheet
2010 CLS:PRINT# 137,"-sorting-"
:DIM A$(50)
2020 OPEN RA$ FOR INPUT AS 1
2030 FOR D=1 TO 100
:LINE INPUT #1,A$(D)
:N=N+1
2040 IF EOF(1) THEN GOTO 2050 ELSE NEXT

```

continued

APPLICATION

research for term papers is to take notes too copiously. This program guards against that error.

Space is provided for four lines of *Comments*, notes which expand on the information already given. There are two matters to keep in mind in entering these lines. First, since commas are used as markers to separate data items in the file, commas cannot be used. After a time this is not a problem. Second, each line is limited to 38 characters.

If any prompt is to be left blank, press the space bar once and then press *ENTER* (in response to the *Comment* prompt, only *ENTER* need be pressed), or the information from the previous record will be entered. Alternately, if several records contain the same information, pressing *ENTER* will default to the previous record (except in the *Comments* section).

The program then displays the record you have entered and asks if you want to save the record or to re-enter it. If you select *Retry*, you are returned to the initial prompt. If you select *Save*, you are given several choices.

Space is provided for four lines of *Comments*

- 1. Next
- 2. View
- 3. Sort
- 4. Menu
- 9. EXIT

Next takes you to the initial prompt for the next record. *View* displays the records already entered one-by-one on the Model 100 screen. *Sort* arranges the records already entered in chronological order. *Menu* returns you to the program's initial menu, where you might choose to enter a new file name. The *Sort* and *View* functions may also be selected from the program's initial menu.

The other choice offered on the program's initial menu is *Print Runsheet*. Upon making this selecting you are prompted for the header the program will print on the runsheet. *Tract Number* refers to whatever system you use for identifying different tracts and runsheets. *Number of Acres* asks for the size of the tract. *Survey* may not be applicable in states where the section system is used to identify tracts of land. The *Date* is the date the runsheet is effective, the date through which records have been examined (for the examiner bears no responsibility for records filed for record after this date). Your name should be entered in response to the *Preparer's Name* prompt. The

```

2050 FOR F=1 TO N-1
2060 FOR S=F+1 TO N
2070 IF A$(F)<=A$(S) THEN 2110
2080 T$=A$(F)
2090 A$(F)=A$(S)
2100 A$(S)=T$
2110 NEXT S
2120 NEXT F
2130 CLOSE
2140 OPEN RAS FOR OUTPUT AS 1
2150 FOR D=1 TO N
    :PRINT #1,A$(D)
    :NEXT D
2160 CLOSE:GOTO 100
3000 '      Print the Runsheet
3010 CLS:INPUT" Tract Number";TR$
3020 INPUT" Number of Acres";AS
3030 INPUT" Survey";SU$
3040 INPUT" Date";DE$
3050 INPUT" Preparer's Name";NA$
3060 INPUT" County";CO$
3070 INPUT" State";SE$
3080 INPUT" 1-draft 2-final";PQ
3090 INPUT" Page 1-66 2-84";LP
3100 OPEN RAS FOR INPUT AS 1
3110 CLS:PRINT:PRINT:PRINT TAB(7)"||PLACE PAPER IN PRINTER||"
3120 LINE INPUT" Press ENTER when ready";A$
3130 CLS:PRINT@ 137, "-printing-"
3140 IF PQ=1 THEN LPRINT CHR$(27)CHR$(23) ELSE LPRINT CHR$(27)CHR$(29)
3150 IF LP=1 THEN IT=5 ELSE IT=7
3155 PN=1
3160 LPRINT: LPRINT USING" Tract \
Page ##";TR$,PN
    :LPRINT
3170 LPRINT TAB(10)"-----"
    :LPRINT
3180 LPRINT USING" TRACT NUMBER \
";TR$,DE$ \
    :LPRINT
3190 LPRINT USING" ####,.### acres \
";AS,NA$ \
    :LPRINT
3200 LPRINT USING" \
County, \
";SU$,CO$,SE$ \
    :LPRINT:LPRINT
3210 FOR I=1 TO IT
3220 INPUT #1,YR$(I),MOS$(I),DYS$(I),VL$(I),PG$(I),RE$(I),GR$(I),GE$(I),AC(I),FI$(I),TY$(I),CA$(I),CB$(I),CC$(I),CD$(I)
3230 LPRINT TAB(10)"-----"
3240 LPRINT TAB(10)"VOL./PAGE BOOK GRANTOR
GRANTEE"
3250 LPRINT USING" \
";VL$(I),PG$(I),RE$(I),GR$(I),GE$(I) \
    :-->
3260 LPRINT TAB(10)"INST. DATE ACRES"
3270 LPRINT USING" \
";##,.##";MOS$(I),DYS$(I),YR$(I),AC(I)

```

continued

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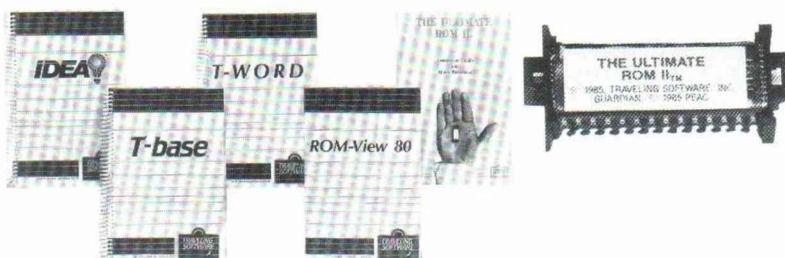
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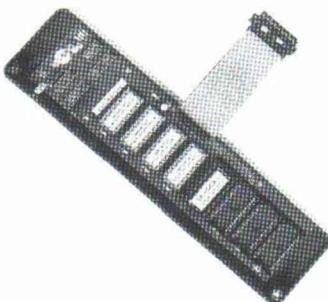
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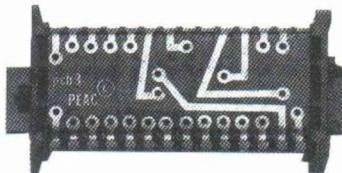
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| MAC-DOS II | AP1-MD1 | AP1-MD1 | AP1-MD1 | AP1-MD1 | AP1-MD1 | |
| LAP-DOS II | PC1-LD1 | PC1-LD1 | PC1-LD1 | PC1-LPD1 | | PC1-LD1 |
| POWERCELL | HW1-PP1 | HW1-PP1 | HW1-PP1 | HW1-PP1 | | |
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| TS-DOS Disk | RS1-TS1 | RS1-TS1 | RS3-TS1 | NE1-TS1 | | |
| TS-DOS ROM Chip | RS1-TS2 | RS1-TS2 | RS3-TS2 | NE1-TS2 | | |
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Traveling Software



County (or *Parish* in Louisiana) and *State* prompts are self-explanatory.

The final two prompts ask for printing instructions. *Draft* or *Final* are applicable to dot-matrix printers which have both draft and near-letter-quality modes. Until you are ready for a final copy, near-letter-quality mode need not be used. The last prompt asks if your paper is 11 inch (66 lines) or 14 inch (84 lines) stock.

The program is written to accommodate fan-fold paper. If you want to use single sheets, the following line should be added to the program: 3367 LINE INPUT "Insert new sheet and press ENTER";A\$

The printer codes included in the program are those for the Tandy DM 130 printer. You should revise these lines to include the appropriate printer codes for your printer.

1. Line 3140 selects either draft mode or near-letter-quality mode. The first *LPRINT* statement is the code for draft mode, and the second *LPRINT* statement is the code for near-letter-quality mode.
2. Lines 3280, 3290, 3300, and 3310 contain, alternatively the codes that turn on and off italic print, so that the *Comments* will be printed in italics. If this feature is not desired, simply eliminate the *LPRINT* statements containing the codes from these lines; otherwise, insert the codes appropriate to your printer.

This program is written to be used with the Holmes-

**This program is written to be
used with the
Holmes-Chipmunk disk drive**

Chipmunk disk drive, to take advantage of its capability to store the data files on the disk and not to be limited by the limitation of the Model 100's RAM size. To store the data files in RAM, revise line 6050: 6050 RA\$=FL\$+".DO":GOTO 110

This program occupies only about 5.4K in RAM, so that on a 32K Model 100 about 24K is free for data files, room for a fairly lengthy runsheet.

While this program is designed for its special purpose, it may easily be revised and adapted to any task in which repetitive information must be recorded. Should you have any problems with running this program, I will be happy to offer solutions to the problems you encounter. I would also welcome details about any improvements or variations you develop. Just write Vincent A. Stewart, Jr., at 215 Lenwood Drive, Nacogdoches, Texas 75961.

End of Listing

After Trying an MS-DOS Portable, My Choice is Still the Model 100

by Patrick Fitzpatrick

Folks often say that choosing a personal computer is difficult because the choice is so personal. It's supposed to become an extension of your ability to produce. If this is true, then choosing a portable is even worse. You only work with a personal computer. With a portable, however, you take it home with you. On trips it even stays in the same room.

My venture into portable computing resulted from the need to work with a computer and to communicate using electronic mail while traveling. About eighteen months ago I began with a Model 100. Six month ago I converted to an MS-DOS compatible Zenith Z-181. I'm now back to my M100.

When I analyzed my needs for a portable I considered five factors. They were:

1. How often do I travel?
2. How do I travel (i.e., car, plane, etc.)?
3. What do I want to do with a portable?
4. Compatibility with our existing computers
5. Price

Naturally, I thought I properly analyzed these factors. When I bought the M100 I did.

I travel rather frequently. Even though I most often travel by car I sometimes fly. Therefore, size and weight were a concern. I didn't want to become dependent on my portable

yet not be able to take it on airplanes. My portable had to be small.

When I looked at what I wanted to do with a portable, I focused on my "hotel room frustrations". I came up with a short list of only three concerns. I wanted to be able to write proposals, to access our electronic mail carrier, and to send thank you notes after sales calls.

Compatibility was a minor concern. I knew I could transfer ASCII files from virtually any portable to our desktop machines through RS232 ports. Price, however, was a

Finally, I can do everything on the road I can do in the office.

major factor. I didn't want to spend a lot of money on my portable.

After a bit of research (really, trying to find the least I could get by with), I chose the M100. It worked great. I quickly became accustomed to the keyboard. I found the text editor sufficient for my writing and easily retrieved and sent electronic mail using its built in modem and communications software. I sent my thank you notes via our E-Mail

carrier's "paper mail" options.

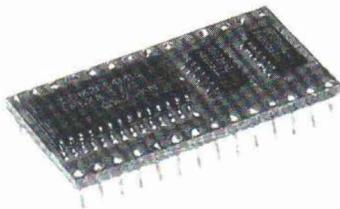
After using the M100 on a few trips, however, I found two problems. First, I consistently ran out of storage space. Between my writing and E-Mail needs, I filled up the M100's RAM the first night out. Second, when I transferred my proposals to our desktop computers I faced formatting problems. When loaded with our desktop word processing software we either got nothing but "hard carriage returns" or no "hard returns" at all.

To solve the first problem I purchased a Tandy portable disk drive and "third party" disk operation software. I found the solution to the "hard returns" on CompuServe's M100SIG. Using a program for our MS-DOS compatibles called *FLTIBM*, text file transfer was easy.

At this point, however, my imagination took over. Since I was convinced portable computing was worthwhile, price was no longer a primary concern. I focused on the things I couldn't do with the M100. I thought about my heavy dependence on Lotus 1-2-3 and the ease with which I produce formatted output using WordPerfect. I convinced myself that I had to have an MS-DOS compatible portable. Obviously, the Model 100 was no longer sufficient.

A few weeks later, a friend called from Ohio. He had decided to sell his Z-181 and wanted to know if I was interested. I jumped at the chance. Fi-

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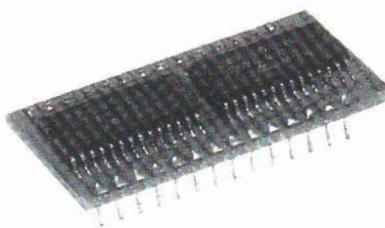
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nally, I thought, I can do everything on the road I can do in the office.

When the Z-181 arrived I had a ball. I bought a 3.5 inch drive for my desktop machine and transferred all my programs and data files. I was now equipped to be as productive while travelling as when in the office. I couldn't wait until my next trip.

When I left for the trip, I carried my Z-181 and left the Model 100 in the office. That was a mistake.

While on the airplane I decided to write a couple of short E-Mail messages. I had to unpack my "ten pound powerhouse," load MS-DOS and then WordPerfect. I wrote the messages and saved them as usual using the F10 key. Then, with some difficulty I repacked my Z-181. It must be worth it, I thought. With this computer I can do everything I can do in the office.

When I reached my hotel room, I again unpacked my Z-181 and loaded MS-DOS. This time, how-

ever, I loaded Crosstalk so I could access our E-Mail carrier. I signed on and sent my messages. I had a problem. The system rejected my messages. They were in WordPerfect format rather than in ASCII.

I signed off, changed diskettes, loaded WordPerfect, loaded each

Unfortunately, I didn't consider the penalties.

message and saved it in ASCII. I again changed diskettes, loaded Crosstalk, and sent the messages.

After that episode, I hardly used the Z-181. I didn't use Lotus 1-2-3 or WordPerfect. I didn't want to take the time. I was accustomed to turning on my portable and going to

work. Before, I didn't have to boot with DOS and then insert the proper program diskette. I also didn't have to worry about proper formats for my E-Mail messages.

I changed to the Z-181 to use all desktop functions on my portable. Unfortunately, I didn't consider the penalties. To include Lotus 1-2-3, WordPerfect, and disk compatibility I had to give up what I really liked about portable computing—ease of use, speed, and convenience. I had to forgo the ability to turn on my computer, quickly write a couple of notes, plug the machine into the wall, and use TELCOM to access E-Mail.

I'm again traveling with my M100. Fortunately, I found a buyer for my Z-181. I don't miss it. I'm glad that I lost five or six extra pounds and regained the capabilities I really need while on the road.

The Power Pipe

*Build your own portable power reservoir
that hides under your computer!*

by Kevin Martin

I used to use a rectangular "D" cell holder as my portable power supply. Unfortunately, this brick is as big as a Portable Disk Drive, and since it dangles freely, it has to be unplugged every time the computer is shifted even a few feet. My "Power Pipe" holds the same four "D" cells neatly out of the way.

Start with a piece of thin-wall PVC plastic pipe, a "drain tailpiece", 1-1/2 inches in diameter by 12 inches long. You'll also need a cheap plastic flashlight and a set of standard Model 100 support legs. I already had wire, solder, a bit of brass tubing and a spare power plug from earlier projects.

Carefully measure the distance between the sockets in the bottom of your computer, where the prop legs

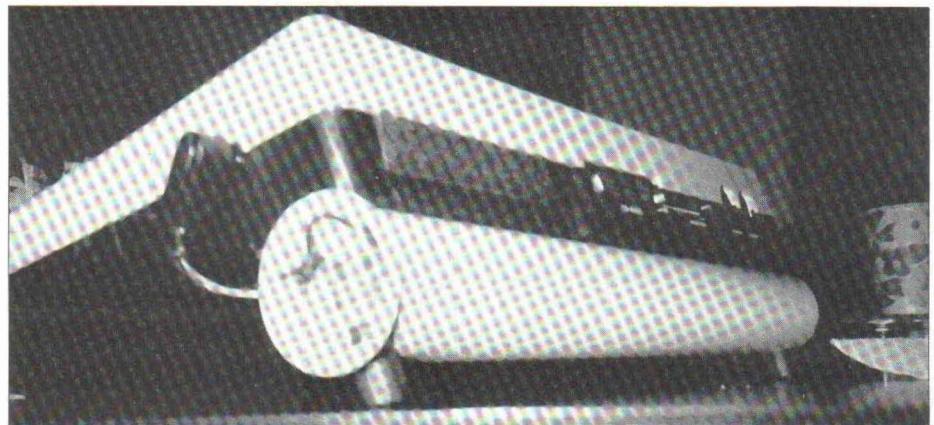


Photo 1. The Power Pipe installed and working away on a Tandy Model 100.

go. Drill holes through each end of the PVC pipe this distance apart. Make the holes slightly undersized at first and open them carefully to insure a snug fit. The holes on one side will be larger, to accept the rubber feet (figure 1). Be sure that these larger holes are both on the same side! The plain ends of the legs must protrude far enough to anchor the power pipe to the computer.

The power plug is the most fragile part of the assembly. You can get one from Radio Shack if you don't mind soldering it yourself... and if you don't mind that it has a brittle plastic shell, and that it sticks straight out from the computer. I gritted my teeth and cannibalized a spare core from a radar detector instead. This greatly increases the reliability of the fin-

ished product. Use a meter or continuity tester to make sure you know which wire goes to the center or "tip" contact of a pre-wired plug. This is the negative lead. I would probably wire the plug in advance in any case, since it is so easy to cut the wires to length afterward.

Make a small hole at the right end of the pipe for the wires. (A grommet here is a nice touch.) For strain relief, route both wires into the hole and tie them in a loose knot. I had to run my negative lead back out of the pipe, because the batteries were a tight fit. While the negative wire runs the length of the pipe, it is out of sight when the Power Pipe is in use. (A thin strip of metal would be a neater alternative, though.)

The negative contact is a big cop-

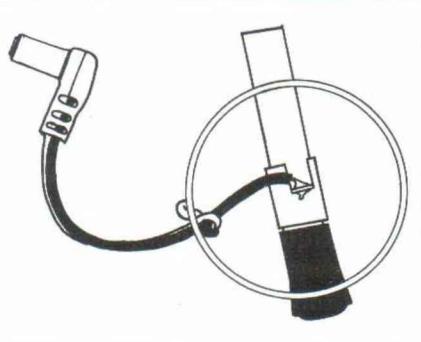


Figure 1. The Model 100 plastic support legs must fit through the holes drilled in the PVC pipe (circle in figure is the PVC pipe).

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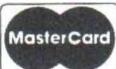
Bytefbyter works on your BASIC programs as they are. It strips unneeded spaces and remark lines, and combines the lines of the BASIC programs to whatever length you specify. By combining lines, Bytefbyter saves a tremendous amount of space. Bytefbyter checks the logic of your program and doesn't combine lines that would cause the program to crash.

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Circle 80 on reader service card

per spring from that cheap "D" cell flashlight. I cut a slot at the left end of the pipe—the end farthest from the computer's power jack—so that the spring and attached negative lead could be inserted or removed for battery changes.

The positive contact is a brass ring, which slips over the plastic part

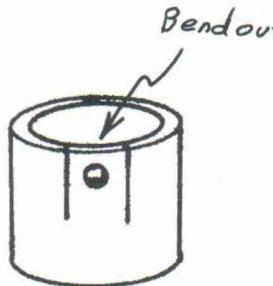


Figure 2. Use "telescope tubing" to make the positive contact, drill a small hole in it, cut a tab, and bend the tab out to make a solder point.

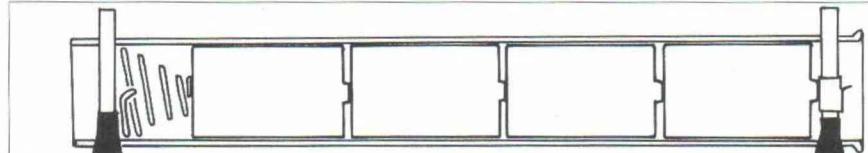


Figure 3. A cut-away view of the finished power pipe.

of a leg. I used "telescoping tubing" from a hobby store for a good fit. You can make a solder lug on the ring by drilling a small hole, then making parallel cuts and bending the resulting flap outward (figure 2). Now is the time to do the soldering, especially if you're using a pre-wired plug. Test fit the pipe in place before you do any soldering, and cut your leads to length accordingly.

To complete the assembly, start the right leg into its hole, and slip the ring over the leg before pushing it fully into place. Insert four "D" size flashlight batteries, all aligned with tips toward the ring contact. Next insert the spring (with its attached

negative wire) behind the batteries and compress it until you can insert the other leg to hold it in place. (Figure 3). Your Power Pipe is now a self-contained unit that you can install or remove at will. If the legs don't align perfectly with the computer, don't panic; enlarge the hole for the left leg slightly, so that you can shift it against the spring's pressure.

When dismounted, the Power Pipe fits snugly with the computer in a Travelling Software carrying case. I've found enough "new" room in my accessory pouch for my acoustic couplers—and with the Power Pipe, I have enough "juice" to use them!

HpCALC

Turn Your Model 100 Into An HP-41

by Scott T. Schad

HpCALC is an easy-to-use shareware RPN (reverse-polish-notation) routine for Tandy model 100/102 laptops, written in BASIC. It emulates the popular Hewlett-Packard calculators, but is not programmable. This article assumes you are familiar with HP calculators and RPN, and concentrates instead on the unique aspects of hpCALC.

HpCALC's best feature is its simple user interface. All options appear on the screen, where they are easily accessed by a sliding-bar menu. You don't need to memorize cryptic keyboard combinations, although several keyboard shortcuts are provided.

Numeric entry can be from the embedded keypad or top row of keys. Use an *E* or *e* to enter powers of ten. Any calculation option shown to the left of the stack window can be selected by using the up and down cursor keys to slide a highlighted bar to the desired row. Hit the *F1-F4* function keys to execute a calculation option when its row is selected. The four arithmetic keys (+-* /) below the stack window are tied to the *F5-F8* keys, and keep their functions regardless of the menu bar position.

KEYBOARD SHORTCUTS

The keyboard provides a handy

hpCALC screen format:

```
1/x  x^2  sqr  y^x [-----hpCALC-----]
log  10^x  ln  e^x [-----]
sin  cos  tan  pi  [ 0 ] x
asin  acos  atan  fix [ 0 ] y
r-p  p-r  int  frc [ 0 ] z
lstd  DEG  rad  del [ 0 ] t
rolu  clrg  sto  rcl [-----]
rold  swap  clx  chs  +  -  *  /
-----
```

Figure 1. The display you see when you first start HpCalc.

```
0 'hpCALC (c) 1987 Scott T. Schad
1 CLEAR2000:SCREEN0,0:CLS:KEYON:ONERRORGOTO84:LX$="0":X$(1)="0":X$(2)
="0":X$(3)="0":X$(4)
="0":K6=57.29577951308232:ONKEYGOSUB32,42,52,62,72,73,74,75:K$(1)="1/x
*x^2 "+CHR$(137)+"x  y^x":E$=CHR$(27)+"p":F$=CHR$(27)+"q
2 R$(1)=CHR$(240)+STRING$(6,CHR$(241))+E$+" hpcalc "+F$+STRING$(6,CHR$(241))+CHR$(242):K$(2)="log 10^x  ln  e^x":R$(3)=CHR$(245)+STRING$(20,"")+
+E$+"x"+F$:K$(3)="sin  cos  tan "+CHR$(136)+""
3 R$(2)=CHR$(244)+STRING$(20,CHR$(241))+CHR$(249):K$(4)="asin  acos
atan  fix":R$(4)=CHR$(245)+STRING$(20,"")+
+E$+"y"+F$:K$(5)="r"+CHR$(154)+"p "+CHR$(154)+"r  int  frc":JF=1:FX=5:R$(5)=CHR$(245)+STRING$(20,"")+
+E$+"z"+F$
4 K$(6)="lstd  DEG  rad  del":R$(6)=CHR$(245)+STRING$(20,"")+
+E$+"t"+F$:K$(7)="rol"+CHR$(152)+" clrg  sto  rcl":R$(7)=CHR$(246)+STRING$(20,CHR$(241))+CHR$(247):K$(8)="rol"+CHR$(153)+" swap  clx  chs":R$(8)="+
-  *  / ":FORI=0TO7
5 IFI<7THENPRINT@I*40,K$(I+1):GOTO7
6 PRINT@I*40,E$+K$(I+1)+F$;
7 IFI<7THENPRINT@I*40+18,R$(I+1):GOTO9
8 PRINT@I*40+20,E$+R$(I+1)+F$;
9 PRINT@I*40+18,H$(I+1):NEXTI:P=7:NP=7:GOSUB76
10 ER=0:PRINT@99,X$(1):I$=INKEY$:IFI$=="THEN10
11 IFI$=="c"THENP1=P:P=7:GOSUB52:P=P1:GOTO10
12 IFI$=="C"THENP1=P:P=6:GOSUB43:P=P1:GOTO10
13 IFI$=="D"ORI$=="d"THENP1=P:P=5:GOSUB64:P=P1:GOTO10
14 IFI$=="S"ORI$=="s"THENP1=P:P=7:GOSUB42:P=P1:GOTO10
15 IFI$=="R"THENP1=P:P=7:GOSUB33:P=P1:GOTO10
16 IFI$=="R"THENP1=P:P=6:GOSUB34:P=P1:GOTO10
17 J=ASC(I$):IFI<32THEN24
18 K=INSTR(1,"-0123456789.Ee",I$):IFK>0ANDJF=1THENHENGOSUB80:X$(1)="
19 IFK=OTHEN23
```

continued

Listing 1. HpCalc turns your Tandy 100/102 into a Hewlett-Packard HP-41C calculator.

method for shortcuts: *r*=roll down stack; *R*=roll up stack; *c*=clear x; *C*=clear registers; *D* or *d*=delete x;s or *S*=swap x&y; *ESC*=exit program. You can execute all of these commands (except *ESC*) by sliding the menu bar and pressing the *F1-F4* keys.

COMMANDS

The *DEG* and *rad* function keys toggle capitalization on and off to indicate the current trigonometric mode. The *Pi* key returns that number up to 14 digits. The *fix* key takes the integer value of the current number in the x-register and trims decimals to that number of displayed digits. You can set from 0-14 digits, with a default of 5 (attempting to use a number out of this range will reset the digits back to 5). The *p-r* and *r-p* options are polar/rectangular conversions: put x in the x register and y in the y register, hit *r-p*, and the radius will be left in x with the angle (in deg or rad) left in y. *p-r* reverses the calculation.

The *lstx* key will bring up the last x-register value which was entered or used in a calculation. *sto* and *rcl* provide access to a single data storage register.

CALCULATION ERRORS

Most errors are self-recovering. If you try to divide by zero for example, an *ERROR* message is briefly shown in the x register, then x is redisplayed.

The accompanying program listing takes nearly 5412 bytes of RAM as a *.DO* file. If you replace the *CHR\$()* functions with literal graphics characters you can cut the *.BA* size to 3800 bytes. The program can be found under the name *HPCALC.100* on the PICO BBS (603-924-9770), the M100SIG on CompuServe, and The ComputerCenter in Tulsa (918-245-3456 or 918-241-5219). (Send CompuServe E-mail to the author at 73720,1166; or leave a message on one of the other boards.) □

```

20 IFK>OANDX$(1)="0" ORKANDX$(1)="" ORK>OANDCR=1THENX$(1)
=I$:CR=0:GOSUB76:GOTO23
21 IFI$="-"ANDVAL(X$(1))=OTHENCR=1:GOTO23
22 IFK>OTHENX$(1)=X$(1)+I$:PRINT@99,X$(1)
23 JF=0:GOTO10
24 IFJ=27THENMENU
25 L=LEN(X$(1)):IFL>OANDJ=8THENX$(1)=LEFT$(X$(1),L-1):GOSUB76:GOTO10
26 IFLEN(X$(1))=OTHENX$(1)="0":GOSUB76:GOTO10
27 IFJ=13THENGOSUB80:X$(1)=X$(2):GOSUB76:CR=1:GOTO10
28 IFJ=3OTHENNP=P-1:IFNP<OTHENNP=7
29 IFJ=31THENNP=P+1:IFNP>7THENNP=0
30 IFNP>PTHENPRINT@P*40,K$(P+1);
31 PRINT@NP*40,E$+K$(NP+1)+F$::P=NP:GOTO10
32 IFP<>5THENNLX$=X$(1)
33 IFP=7THENNLX$=X$(1):X$(1)=X$(2):X$(2)=X$(3):X$(3)=X$(4):X$(4)
=LX$:JF=1:CR=1:GOSUB76:RETURN
34 IFP=6THENNLX$=X$(1):X$(1)=X$(4):X$(4)=X$(3):X$(3)=X$(2):X$(2)
=LX$:JF=1:CR=1:GOSUB76:RETURN
35 IFP=5THENGOSUB80:X$(1)=LX$:JF=1:GOSUB76:RETURN
36 IFP<>4THEN38
37 R=SQR(VAL(X$(1))^2+VAL(X$(2))^2):RA=(ATN(VAL(X$(2))/VAL(X$(1)))*K6)
:X$(1)=STR$(R):X$(2)=STR$(RA):JF=1:GOSUB76:RETURN
38 IFP=3THENGOSUB83:JF=1:GOSUB76:RETURN
39 IFP=2THENX$(1)=STR$(SIN(VAL(X$(1))/K6)):JF=1:GOSUB76:RETURN
40 IFP=1THENX$(1)=STR$(LOG(VAL(X$(1))*.4342945)):JF=1:GOSUB76:RETURN
41 IFP=OTHENJF=1:X$(1)=STR$(1/VAL(X$(1))):GOSUB76:RETURN
42 LX$=X$(1):IFP=7THENX$(1)=X$(2):X$(2)=LX$:JF=1:CR=1:GOSUB76:RETURN
43 IFP=6THENX$(1)="0":X$(2)="0":X$(3)="0":X$(4)
="0":ST$="0":JF=1:CR=1:GOSUB76:RETURN
44 IFP=5THENK6=57.29577951308232:GOSUB81:RETURN
45 IFP<>4THEN47
46 Y=VAL(X$(1))*(SIN(VAL(X$(2))/K6)):X=VAL(X$(1))*(COS(VAL(X$(2))/K6))
:X$(1)=STR$(X):X$(2)=STR$(Y):JF=1:GOSUB76:RETURN
47 IFP<>3THEN49
48 GOSUB83:JF=1:X$(1)=STR$(K6*(.3.1415926535898/2)-(VAL(X$(1))))
:GOSUB76:RETURN
49 IFP=2THENX$(1)=STR$(COS(VAL(X$(1))/K6)):JF=1:GOSUB76:RETURN
50 IFP=1THENX$(1)=STR$(10^VAL(X$(1))):JF=1:GOSUB76:RETURN
51 IFP=OTHENX$(1)=STR$(VAL(X$(1))^2):JF=1:GOSUB76:RETURN
52 LX$=X$(1):IFP=7THENX$(1)="0":JF=1:CR=1:GOSUB76:RETURN
53 IFP=6THENJF=1:ST$=X$(1):GOSUB76:RETURN
54 IFP=5THENK6=1:GOSUB81:RETURN
55 IFP<>4THEN58
56 IFINSTR(1,X$(1),"")=OTHENRETURN
57 DP=INSTR(1,X$(1),""):$X$(1)=LEFT$(X$(1),DP):JF=1:GOSUB76:RETURN
58 IFP=3THENX$(1)=STR$(ATN(VAL(X$(1)))*K6):JF=1:GOSUB76:RETURN
59 IFP=2THENX$(1)=STR$(TAN(VAL(X$(1))/K6)):JF=1:GOSUB76:RETURN
60 IFP=1THENX$(1)=STR$(LOG(VAL(X$(1))):JF=1:GOSUB76:RETURN
61 IFP=0THENX$(1)=STR$(SQR(VAL(X$(1))):JF=1:GOSUB76:RETURN
62 LX$=X$(1):IFP=7THENX$(1)=STR$(-VAL(X$(1))):GOSUB76:RETURN
63 IFP=6THENGOSUB80:JF=1:X$(1)=ST$:GOSUB76:RETURN
64 IFP=5THENX$(1)=X$(2):GOSUB79:GOSUB76:JF=1:RETURN
65 IFP<>4THEN68
66 IFINSTR(1,X$(1),"")=OTHENRETURN
67 DP=LEN(X$(1))-INSTR(1,X$(1),""):$X$(1)=RIGHT$(X$(1),DP+1)
:JF=1:GOSUB76:RETURN
68 IFP=3THENFX=INT(VAL(X$(1))):IFFX<0ORFX>14THENFX=5:RETURN
69 IFP=2THENJF=1:GOSUB80:X$(1)="3.1415926535898":GOSUB76:RETURN
70 IFP=1THENX$(1)=STR$(2.7182818284590^VAL(X$(1))):JF=1:GOSUB76:RETURN

71 IFP=0THENJF=1:X$(1)=STR$(VAL(X$(2))^VAL(X$(1)))
:GOSUB79:GOSUB76:RETURN
72 LX$=X$(1):JF=1:X$(1)=STR$(VAL(X$(2))+VAL(X$(1))):GOSUB79:GOTO76
73 LX$=X$(1):JF=1:X$(1)=STR$(VAL(X$(2))-VAL(X$(1))):GOSUB79:GOTO76
74 LX$=X$(1):JF=1:X$(1)=STR$(VAL(X$(2))*VAL(X$(1))):GOSUB79:GOTO76
75 LX$=X$(1):JF=1:X$(1)=STR$(VAL(X$(2))/VAL(X$(1))):GOSUB79:GOTO76
76 PV=VAL("0."+STRINGS(FX,"0")+"5"):BA=VAL("1"+STRINGS(FX,"0"))
:FORI=1TO4:PRINT@(I+1)*40+19,STRINGS(20," "):IFX$(I)="-"ORX$(I)
=".":THEN78
77 XX=VAL(X$(I)):XX=FIX((XX+PV*SGN(XX))*BA)/BA:X$(I)=STR$(XX)
78 PRINT@I+1)*40+19,X$(I):NEXTI:IFER=1THENER=0:RETURN
79 IFER=1THENER=0:RETURN
80 IFER=1THENER=0:RETURN
81 IFK6=1THENK$(6)="lstx deg RAD del"ELSEK$(6)="lstx DEG rad del"
82 PRINT@5*40,E$+K$(6)+F$::RETURN
83 X$(1)=STR$(2*ATN(VAL(X$(1))/(1+SQR(ABS(1-VAL(X$(1))^2))))*K6)
:RETURN:IFX$(1)=""THENX$(1)=X$(2)::RETURN
84 BEEP:PRINT@99,"ERROR":ER=1:RESUMENEXT

```

End of listing.

Making BASIC Poke Programs

If you have access to a desktop computer, you can forget cassette storage and use the RS-232 port to save files on it. But what about machine-language programs? Here's one solution.

by Frank W. Schrader

Before acquiring a disk drive for my Model 100, but being the owner of a Model 4P, I was in the habit of sending text files and basic programs, in ASCII format, from my laptop to the Model 4P via the RS-232 line. I did this partly to have a second copy on the Model 4 disc, but mainly to avoid the aggravation of cassette loading on the Model 100.

This is fine for ASCII BASIC files and ASCII TEXT files, but, of course, .CO files written in machine language are a different problem. It is necessary to send the assembly language source code to the Model 4P, and then reassemble it after downloading to the Model 100. This is at the expense of some 8K of memory

```
1 CLS
2 INPUT "START ADRS. "; S
3 INPUT "END ADRS. "; E
10 OPEN "RAM:NOTE.D0" FOR APPEND AS 1
11 PRINT #1, "10 FOR I=S TO E"
12 PRINT #1, "20 READ N"
13 PRINT #1, "30 POKE I,N"
14 PRINT #1, "40 NEXT I"
15 PRINT #1, "1000 DATA "
20 FOR I=S TO E-1
30 A$=STR$(PEEK(I))
40 PRINT #1,A$+",";
50 NEXT I
55 A$=STR$(PEEK(I))
57 PRINT #1,A$
100 CLOSE #1
```

Listing 1. The program MAKDAT.BA.

```
1 CLS
2 CLEAR 0,49151
5 LOADM "DEC2BN.CO"
10 INPUT N
20 CALL 52224,N
25 ON ERROR GOTO 1000
30 GOTO 10
1000 RESUME 1
```

Listing 2. Program DEC2BN.BA for running DEC2BN.CO from BASIC.

because I have to use the TRS-80 Model 100 Debug/Assembler to do program assembly.

With the .CO file in memory and appearing on the menu, installing and running the BASIC program MAKDAT.BA will generate a BASIC poke program which shows up on the menu as NOTE.D0. The starting and end address, required by the prompts in MAKDAT.BA, can be found in BASIC by entering the command LOADM "XXXXXX.CO", where "XXXXXX.CO", is the machine language program name. Loading and running NOTE.D0 in BASIC will generate a BASIC poke program. The BASIC program, saved as a .DO file can then be sent over the RS-232 line to another computer. You must be sure to KILL any NOTE.D0

files that might appear on the menu before starting this procedure.

I am giving you two example programs. They are suitable as source code for assembling with the Debug/Assembler. They can also be used as BASIC POKE programs suitable for generating object code. DEC2BN.CO accepts a decimal

| | | |
|-------|-----|----------|
| | ORG | 0CC00H |
| | LXI | D,8H |
| | LXI | H,0F685H |
| LOOP: | RAL | |
| | JC | PUT1 |
| | JNC | PUT0 |
| HERE: | INR | L |
| | DCR | E |
| | JNZ | LOOP |
| | JMP | DONE |
| PUT1: | MVI | M,31H |
| | JMP | HERE |
| PUT0: | MVI | M,30H |
| | JMP | HERE |
| DONE: | LXI | H,0F685H |
| | LXI | D,8 |
| RPT: | MOV | A,M |
| | RST | 4 |
| | INR | L |
| | DCR | E |
| | JNZ | RPT |
| FIN: | RET | |
| | END | |

Listing 3. Source program for DEC2BN.CO.

number in the range 0 to 255 and and returns the 8 digit binary number representation of it. This program comes from the *BASIC* program *DEC2BN.BA*.

Program *ASC2BN.CO*, runs from the menu, after you generate and save it with *SAVEM "ASC2BN.CO"*, 52224, 52310, 52224. The entry address (the final number) is necessary if it differs from the start address. This is the same program as *DEC2BN.CO* with additions to give an example of a program with a data statement that is too long. In this case it is necessary to edit the poke program as shown to break the data statement into separate lines. Be sure to remove any superfluous commas or you will get a SYNTAX ERROR when attempting to run it.

ASC2BN.CO which, as stated, can run from the main menu, accepts any printable keystroke and displays it with its binary representation. To interrupt it and return to the main menu, hit *CTRL Q*.

Of course, starting with the general idea, *MAKDAT.BA* could be revised to divide up the data state-

| | ORG | OCC00H | LOOP: | |
|-------|------|----------|-------|--------------|
| WAIT: | LXI | H,0C04H | RAL | |
| | CALL | 427CH | JC | PUT1 |
| | CALL | 4249H | JNC | PUT0 |
| | CALL | 12CBH | HERE: | |
| | CPI | 11H | INR | L |
| | JZ | FIN | DCR | E |
| | CPI | 20H | JNZ | LOOP |
| | JC | 0CC00H | JMP | DONE |
| | PUSH | PSW | PUT1: | MVI M,31H |
| | MVI | A,22H | JMP | HERE |
| | RST | 4 | PUT0: | MVI M,30H |
| | POP | PSW | JMP | HERE |
| | RST | 4 | DONE: | LXI H,0F685H |
| | PUSH | PSW | LXI | D,8 |
| | MVI | A,22H | RPT: | MOV A,M |
| | RST | 4 | RST | 4 |
| | MVI | A,3DH | INR | L |
| | RST | 4 | DCR | E |
| | POP | PSW | JNZ | RPT |
| | LXI | D,8H | CALL | 4222H |
| | LXI | H,0F685H | JMP | WAIT |
| | | | FIN: | RET |
| | | | | END |
| | | | | WAIT |

Listing 4. Source code for *ASC2BN.CO*.

ments and generate a *POKE* program that does not need editing, but let's keep it simple for now, shall we?

As always, when poking around in memory, it is very easy to wind up at 00:00:00 hours, on Sunday, Jan 01, 1900, with all your programs and

files gone. Be sure to save all indispensable programs to disk or cassette, before fooling around with the computer's mind!

```
10 FOR I= 52224 TO 52310
20 READ N
30 POKE I,N
40 NEXT I
1000 DATA 33, 4, 12, 205, 124, 66, 205, 73, 66, 205, 203, 18, 254, 17, 202, 86
204, 254, 32, 218, 0, 204, 245, 62, 34, 231, 241, 231, 245, 62, 34, 231, 62, 61,
231, 241, 17, 8, 0, 33, 133, 246, 23, 218, 57, 204, 210, 62, 204, 44, 29, 194,
42, 204, 195, 67, 204, 54, 49, 195, 49, 204, 54, 48, 195, 49, 204, 33, 133, 246,
17, 8, 0, 126, 231, 44, 29, 194, 73, 204, 205, 34, 66, 195, 0, 204, 201
```

Listing 5. Program *NOTE.DO* as generated by *MAKDAT.BA*. The *DATA* statement is too long for *NOTE.DO* to load into *BASIC*.

```
10 FOR I= 52224 TO 52310
20 READ N
30 POKE I,N
40 NEXT I
1000 DATA 33, 4, 12, 205, 124, 66, 205, 73, 66, 205, 203, 18, 254, 17, 202, 86,
204, 254, 32, 218, 0, 204, 245, 62, 34, 231, 241, 231, 245, 62, 34, 231, 62, 61,
231, 241, 17, 8, 0
1010 DATA 33, 133, 246, 23, 218, 57, 204, 210, 62, 204, 44, 29, 194,
42, 204, 195, 67, 204, 54, 49, 195, 49, 204, 54, 48, 195, 49, 204, 33, 133, 246,
17, 8, 0, 126, 231, 44, 29, 194, 73, 204, 205, 34, 66, 195, 0, 204, 201
```

Listing 6. Program *NOTE.DO* after editing to remove the problem of a *DATA* statement that's too long.

Reverse Bank Switching

All Tandy 200's were created equal but you can make yours superior by customizing your laptop and adding some features that should have been there in the first place.

We will begin by adding a much desired feature, REVERSE BANK SWITCHING, to the unused F2 function key at the Menu. This will let you go from bank 3 to bank 2 (or 2 to 1, or 1 to 3) instead of having to bank switch forward only all the time. This will be of no importance if our Tandy 200 does not have 3 banks of RAM, but information presented here can be used for many other things. For those who do have 3 banks of RAM, you will really like this enhancement.

When developing the Tandy 200 software, Microsoft was very kind to us programmers by installing RAM "hooks" in various system operations. These hooks let us add features, fix bugs, or simply enhance certain processes, without having to make a new ROM chip.

The fourth hook in the RAM hook table, located at F50DH, appears to be a hook called by the keyscan subroutine, and is constantly being called by the T200 operating system. Normally, the word at F50DH contains the address of a RETURN instruction, so a "do nothing" operation is in place every time the F50DH hook is called. You can have F50DH point to your new, personal subroutine, and when a RETURN instruction is executed at the end of the subroutine, control will be given back to the Tandy 200 ROM.

Now that we can hook into the keyscan subroutine, we can examine every keystroke. To install reverse bank switching, we do not wish to disturb the normal functions of the computer. We wish to only take action if the F2 key was pressed at the Menu, and to allow the Tandy 200 to continue to function normally if not. To do this we must unwind the stack.

```

0 CLS:CLEAR 256,60000
1 FOR I=60000 TO 60134
2 PRINT@50,I:READ X:POKE I,X:SM=SM+X
3 NEXT
4 IF SM=15927 THEN CALL 60000
5 BEEP:PRINT"error in data":STOP
100 DATA 195,183,234,42,13,245,17
101 DATA 31,160,223,202,164,103,34
102 DATA 67,160,235,34,13,245,195
103 DATA 164,103,66,97,110,107,32,66
104 DATA 97,99,107,0,245,197,213,229
105 DATA 56,10,237,17,188,104,223
106 DATA 194,62,160,205,150,79,33
107 DATA 21,160,205,204,17,58,12
108 DATA 253,254,2,202,69,160,225
109 DATA 209,193,241,195,168,156,243
110 DATA 219,216,198,4,230,12,254
111 DATA 12,202,72,160,71,195,105

```

continued after next page

This BASIC program will POKE a machine-language driver into low memory on your Tandy 200, letting you go in both directions when bank switching.

```

;*****LOMEM HOOK CODE BY P.GLOBMAN*****
;* Copyright (C) 1987 *
;*****LOMEM HOOK CODE BY P.GLOBMAN*****

X: EQU 60003-A001H ;CALC OFFSET
GONE: EQU 9CA8H
HOOK04: EQU F50DH
MENU: EQU 67A4H
POINT: EQU 4F96H
PRINT: EQU 11CCH
;-----
ORG 60000
JMP START ; TO RELOCATOR
;
LOADER: LHLD HOOK04 ;ORIG. JUMP
LXI D, HOOK-X ;ADRS OUR HOOK
RST 3 ;CMP HL - DE
JZ MENU ;ALREADY THERE
;
SHLD BYE+1-X ;BYE+1=OLD HOOK
XCHG
SHLD HOOK04 ;HOOK=OUR CODE
JMP MENU
;-----
LABEL: DB 'Bank Back', 0
;
HOOK: PUSH PSW ;SAVE ALL REG
PUSH B
PUSH D
PUSH H
;
DESP 10 ;LOOK AT SP 10
LHLI ;BYTES BACK
LXI D, 68BCH
RST 3 ;CMP TO 68BCH
JNZ DONE-X ;IF EQ->AT MENU
;
;AT MAIN MENU
;
CALL POINT ;PRINT LABEL
LXI H, LABEL-X ;LINE ON THE
CALL PRINT ;MAIN MENU
;
LDA 64780 ;CHECK LAST KEY
CPI 2 ;PRESSED AND
JZ BNK-X ;IF F2 -> BACK
;
DONE: POP H ;ELSE RESTORE
POP D ;AND EXIT
POP B ;BYE+1 (GONE)
POP PSW ;is altered by
BYE: JMP GONE ;loader subrtn
;-----

```

Continued on next page

Listing 2. The Assembly code listing for the Bank Switching routine.

The "stack" is simply an area in RAM that is used by the CPU for various tasks. The process of unwinding the stack will require the use of the 80C85's internal registers, so before we begin, we must save the status of the CPU so it can be restored later. Unwinding the stack means finding the address of the stack pointer and looking at the contents of the address to see the address the program will begin to execute when the *RETURN* instruction is executed. In other words, we want to find out where the CPU was working when it jumped to the F50DH hook.

Actually, it's not the address that our routine will return to, but the address that that routine returns to, that will tell us if we are at the Menu. If the *RETURN* from F50DH brings us to 68BCH, then the keystrokes we would be looking at were pressed when the Tandy 200 was at the Menu. If not we will restore all registers and return control to the Tandy 200 ROM.

If we are at the *Menu* then the next step is to see if the *F2* key was pressed. This is done by examining the byte at memory location 64,780 and looking at the 2nd bit. If the 2nd bit is on, then *F2* was pressed and we can jump to the REVERSE BANK SWITCHING routine. If not, then we just restore the CPU and give control back to the Tandy 200 ROM.

After locating the ROM address for bank switching and studying the code, I have determined that the best way to go back one RAM bank was to really go forward two banks. The best way to accomplish this is to trick the Tandy 200 into thinking that we are calling the routine from one bank ahead, and let the code in ROM advance us to the bank after that.

Normally the "hook" we are using does a simple *RETURN*, but suppose another software package uses that hook. A perfect example is the Polar Engineering *ROM2*, which I used to develop this code. If I simply have the hook point to my routines then I will disable the software that is currently using that hook.

To avoid this I must do the following. First look at the hook and see if it is being used. If not, then there is no problem. If the hook is being used, then I want to have the hook jump to my code and then jump to whatever address the hook was pointing to. This will insert my routine into the operation and allow other routines to also execute.

The only foreseeable problem is if we try to install our hook without realizing that it is already installed. We cannot allow the *LOADER* to execute or we will find ourselves in an endless loop, jumping from the end of our code to the beginning of our code. The *LOADER* routine prevents this problem.

I will discuss the installation of additional function keys (at the *Menu*) in a follow-up article, but for

THE CUSTOM 200

now we must focus our attention on other matters. First there is the problem of WHERE to install this code. It must not ever be over-written by .CO files or the hook will most likely send us back to Jan 01,1900. If we run it in HIMEM, we will deny ourselves the use of most .CO programs, and that is totally unacceptable.

RAM memory begins at address A000H, but we can trick the Model 200 into thinking that RAM begins at A100H and the 256 bytes of RAM, from A000H to A100H will be at our disposal. It will be protected from the operating system and is perfect for our needs.

To adjust LOMEM we must start with a completely empty bank. Cold starting a RAM bank is the quickest way to accomplish this task. Next we must load, copy, or type in the following TEXT file.

```
1 KILL"LOMEM.DO"
2 N=1:AD=40960
3 POKE AD,N
4 POKE AD+256*N,0
5 POKE 62703,160+N
6 NEW
```

This must be a TEXT file, not a BASIC program, and this TEXT file must be called LOMEM.DO. The variable N in line 2 is set for the number of 256 byte blocks you wish to reserve.

With LOMEM.DO as the only file in the RAM bank, enter BASIC and RUN "LOMEM". This program will end with a SYNTAX error but that is correct. At the "OK" prompt type NEW and press ENTER (**this is very important**). Now there should be no syntax error. When you return to the Menu LOMEM.DO will no longer be there and the Bytes Free message will be 19334 (19590-256). We now have a place to store and execute the code for our keyscan "hook".

THE RELOCATOR

As a precaution to avoid destroying RAM files, ROM2 will not allow code to be assembled below HIMEM. A method must be devised so the code can be assembled above HIMEM and then moved to LOMEM. This alone is simple enough but all of the jumps within our hook must be adjusted in the source code before assembly.

The proper offset can be found by subtracting A001H from the actual location of the address that the code is assembled to. This offset will then be subtracted from all references to locations within the code to be moved.

I believe this discussion has covered all the topics necessary for the BASIC and ML programmer to study the listing and understand it.

—Paul Globman

;REVERSE BANK SWITCHING

```
BNK:    DI           ; INSTEAD OF
        IN D8H       ; BACK ONE BANK,
B1:     ADI 4       ; WERE REALLY
        ANI OCH      ; GOING AHEAD
        CPI OCH      ; TWO BANKS BY
        JZ B1-X      ; MAKING THE ROM
        MOV B,A      ; THINK WE BEGAN
        JMP 9B69H    ; 1 BANK AHEAD
=====
;MOVE HOOK INTO PLACE AND INITIALIZE
;
START:  LXI B,START-LOADER ;# of bytes
        LXI H,LOADER   ;source
        LXI D,LOADER-X ;destination
        CALL 8316H    ;move block
;
;FIX BASIC F6 / F7
;
        MVI B,22      ;# of bytes
        LXI D,KEY_6    ;source
        LXI H,F145H    ;destination
        CALL 41BAH    ;move it
;
        JMP LOADER-X  ;INITIALIZE
;
KEY_6:  DB 'Hook',24,'Call140961',13,0
        DB 'Edit ',0
```

End of listing.

Listing 3. The remainder of the assembly code listing.

```
112 DATA 155,1,84,0,33,99,234,17,1
113 DATA 160,205,22,131,6,22,17,209
114 DATA 234,33,69,241,205,186,65
115 DATA 195,1,160,72,111,111,107
116 DATA 24,67,97,108,108,52,48,57,54
117 DATA 49,13,0,69,100,105,116,32,0
118 REM          END OF DATA
```

End of listing.

Listing 4. The remainder of the BASIC code for producing the bank switching program.

Taller, Stronger, Faster

Back in my old TRS-80 Model I days, I quickly learned that my programs had to be fast and compact to run satisfactory on the Z-80-based, 4K RAM computer. Despite the Model 100's having eight times the memory of my first microcomputer, I still try to write efficient code. I may not find the *best* way of programming a problem, but I'm always looking for new tricks.

Take, for example, the very simple task of determining whether an integer is even or odd. Humans don't need a program; we only look at the last digit, and if it's a 0, 2, 4, 6, or 8, the number is even. Or, we could test to see if the number is evenly divisible by two.

Most computer languages, and other dialects of Basic, contain a built-in function called FRC (fractional part). Where the BASIC command `FIX(1.5)` yields 1, (that is, `FIX` chops off the decimal portion of a number) `FRC(1.5)` returns .5. If we had such a function on the Model 100, we could test for evenness with `IF FRC(X/2)=0 THEN PRINT "Even"` `ELSE PRINT "Odd"`

We don't have that handy function on the Model 100. But we can simulate it with by doing the equivalent of `X-FRC(X)`. To check for evenness: `IF X/2-FIX(X/2)=0 THEN PRINT "Even"` `ELSE PRINT "Odd"`

A slight improvement offered by a

little algebra is `IF X/2=FIX(X/2)` `THEN PRINT "Even"` `ELSE PRINT "Odd"`

Let's write a little program to see how long this method would take to determine the evenness of the integers from 1 to 20,000. Because the Print function itself is so slow, we'll assign the strings *even* and *odd* to a variable. Our test will modify the real-time clock, so you'll need to reset it when we're done.

That's a good 29 percent speed improvement.

```
100 DEFINT A-Z
110 TIME$="00:00:00"
120 FOR X=1 TO 2000
130 IF X/2=FIX(X/2) THEN Y$ = "Even" ELSE Y$ = "Odd"
140 NEXT X
150 PRINT TIME$
```

If you'd like to verify that the program's performing the test accurately, insert 135 `PRINT X,Y$`

The program, without line 135, takes 530 seconds to run on my Tandy 102, and the tokenized BASIC file occupies 103 bytes. Can we do better?

INTEGER DIVISION

Model 100-family BASIC offers a shortcut for calculating values such as `FIX(X/2)`, using the integer-division operator, indicated by a back-slash, keyed as `CTRL-UNDERSCORE`. What happens if we use that under-used operator instead of the `FIX` function call? Enter a new line 130: `130 IF X/2=X\2 THEN Y$="Even" ELSE Y$="Odd"`

This version of the program completed its run in 374 seconds, and required only 100 bytes of precious RAM. That's a good 29 percent speed improvement. But can we do better?

HERE COMES LOGIC

Let's try a whole new approach by looking at even and odd numbers as binary integers. The number 56 in binary is 00111000, the integer 57 is 00111001, 58 is 111010 and 59 is 111011. Notice that the even numbers have a *zero* as the right-most (least-significant) bit, and odd numbers have a *one*. We can use that observation, along with a bit of Boolean logic, to check for evenness.

The `AND` Boolean operation compares two binary numbers, bit for bit. If both bits in a certain position are *one*, the corresponding bit in the resulting binary number is also a *one*. But if either or both of the bits are a *zero*, the resulting bit is also a *zero*.

What happens if we `AND` our inte-

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ger against a binary one? Let's start with 56:

```
00111000 (56)
00000001 (1)
----- (AND)
00000000 (0)
```

Even numbers return a binary zero. How about 57?

```
00111001 (57)
00000001 (1)
----- (AND)
00000001 (1)
```

Odd integers yield a binary one. Can we use that in our even/odd testing program? Change line 130 to: *130 IF X AND 1=0 THEN Y\$="Even"* *ELSE Y\$="Odd"*

Before we run the test, let's make one improvement that takes into account the Boolean logic used in the IF statement: *130 IF X AND 1 THEN Y\$="Odd" ELSE Y\$+"Even"*

This program version, which occupies 98 bytes of RAM, required

only 101 seconds to run. It's definitely the way to go—81 percent faster than using *FIX()*. To verify that it, indeed, does test for evenness, you can reinsert line 135, above.

IS IT REAL OR IS IT INTEGER?

We've been working only on inte-

Always look for new approaches to old problems

gers. How do our three even-testing algorithms perform when we're using floating-point numbers?

We can test this by changing the loop counter to a double-precision real variable with a new line 100: *100 DEFDBL A-Z*

In addition to consuming more

RAM, real numbers also move slower than integers. The original *FIX()* version required 538 seconds to run, the integer-division approach needed 407 seconds, and the *AND* alternative took a mere 147 seconds to complete.

THE MORAL

Is there a moral to the story? Yes, and it's a simple but important one: Keep an open mind. Look for new approaches to old problems. And never be satisfied with, "it works."

My old divide-by two test, which used *FRC*, *FIX* or integer division, worked fine, and I used it in many programs, but a little doubt, some unorthodox thinking, and a five-word question—"Can I do better"—paid off. And, you know, it always does.

—Alan L. Zeichick

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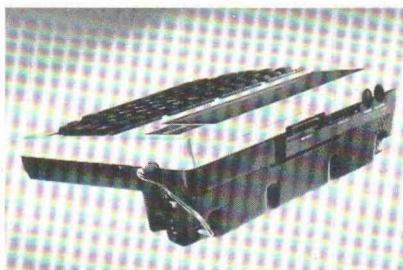
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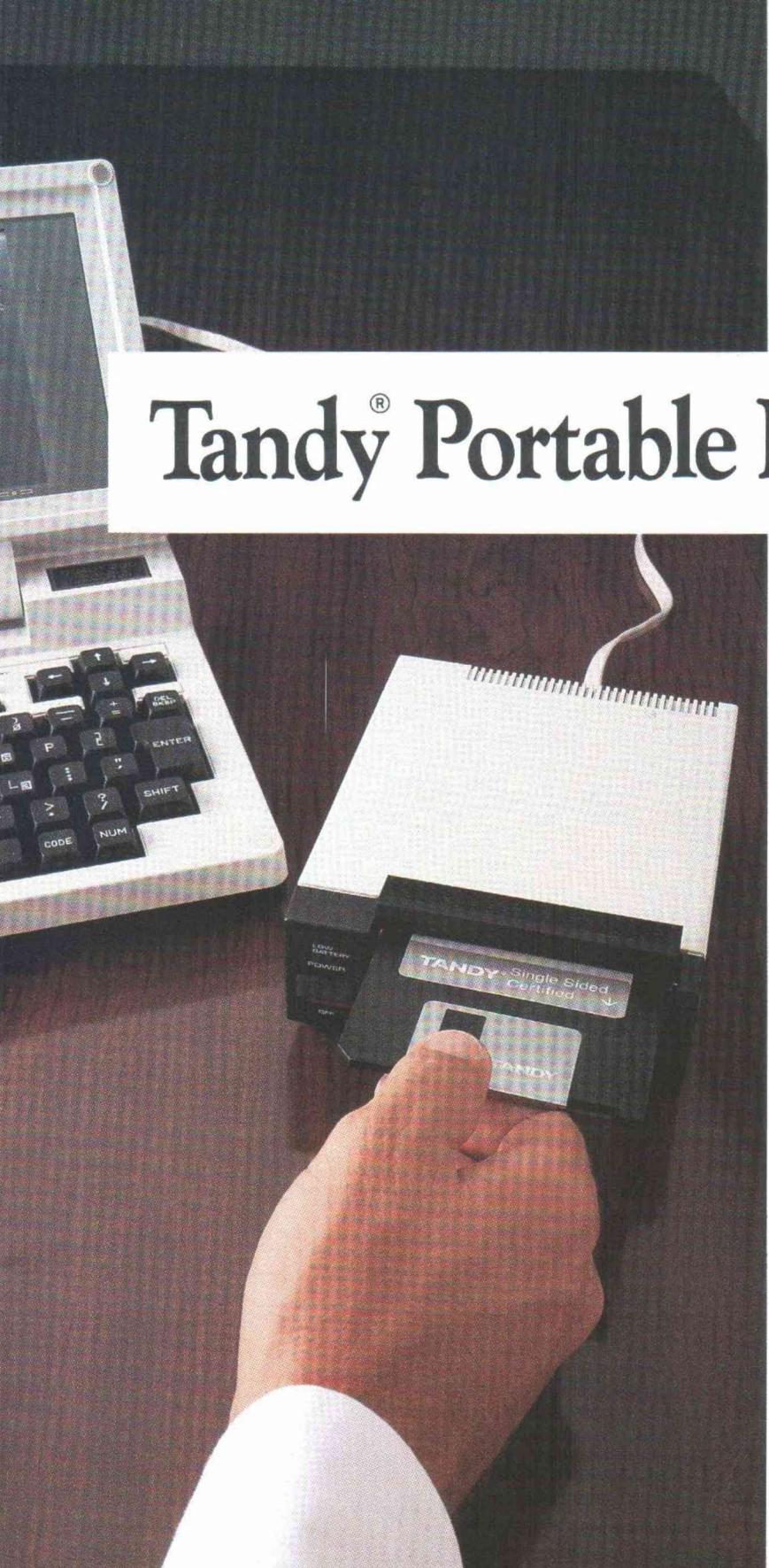
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The four best programs for the Model 100 all on one ROM, 32K of power without using any RAM for program storage. This is the PCSG Snap-In ROM that just presses easily into the little ROM socket in the compartment on the back. You access the four right from the main menu like built-ins.

Write ROM — the definitive word processor for the Model 100. Function key formatting or dot commands. Search and replace. Library feature — inserts words, phrases or whole documents into text from just a code. MAP lets you see a picture of your document. In all there are 60 features and functions. No one can claim faster operation. FORM lets you create interactive forms with on-screen prompts that you can answer from the keyboard. Nothing else for the Model 100 compares with the features of Write ROM. Exactly the same as the Write ROM sold as a single program. Infoworld says it "makes the Model 100 a viable writing unit... sur-

passed our highest expectations for quality and clarity."

Lucid Spreadsheet: This is the one PICO magazine says "blows Multiplan right out of the socket" and Infoworld performance rated as "excellent" and said "makes the Model 100 compute." Gives you features you cannot get with Lotus 123. Lets you build spreadsheets in your Model 100 that would consume 140-150K on a desktop. Program generating capability with no programming knowledge required. Variable column widths. Includes find and sort with function key control. It's fast, recalculates like lightning. No feature has been taken from the original, only new ones added.

Database: This is a relational data base like no other. You can do everything from mailing lists to invoices. No complicated pseudo-coding, you create input screens as simply as typing into TEXT. You are not limited by size; you can have as large an input screen as you wish. Prints out reports or forms, getting information from as many files as

you like. Complete math between fields. Total interface with Lucid worksheets.

Outliner: Does everything that Think-tank does on a PC but a whole lot better. Includes a Sort for your headlines. Lets you have headlines of up to 240 characters. Has cloning, hoisting and sideways scroll up to 250 characters. Like Lucid, this one sets a new standard for outliners. This is the way to plan and organize your projects.

Present Lucid and Write ROM owners can upgrade for \$150. If you have both it's \$125.

As usual PCSG sells the Super ROM on a thirty day guarantee. If for any reason you are not satisfied, simply return it for a full refund.

We are excited about this product. Super ROM gives the Model 100 the true power of a desktop. No other multi-program ROM has software that compares. But don't take our word for it. We invite you to make that comparison yourself. Priced at \$199.95 on Snap-In ROM.

*Got stuck with somebody else's multi-ROM?
We'll upgrade it for \$150.*

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